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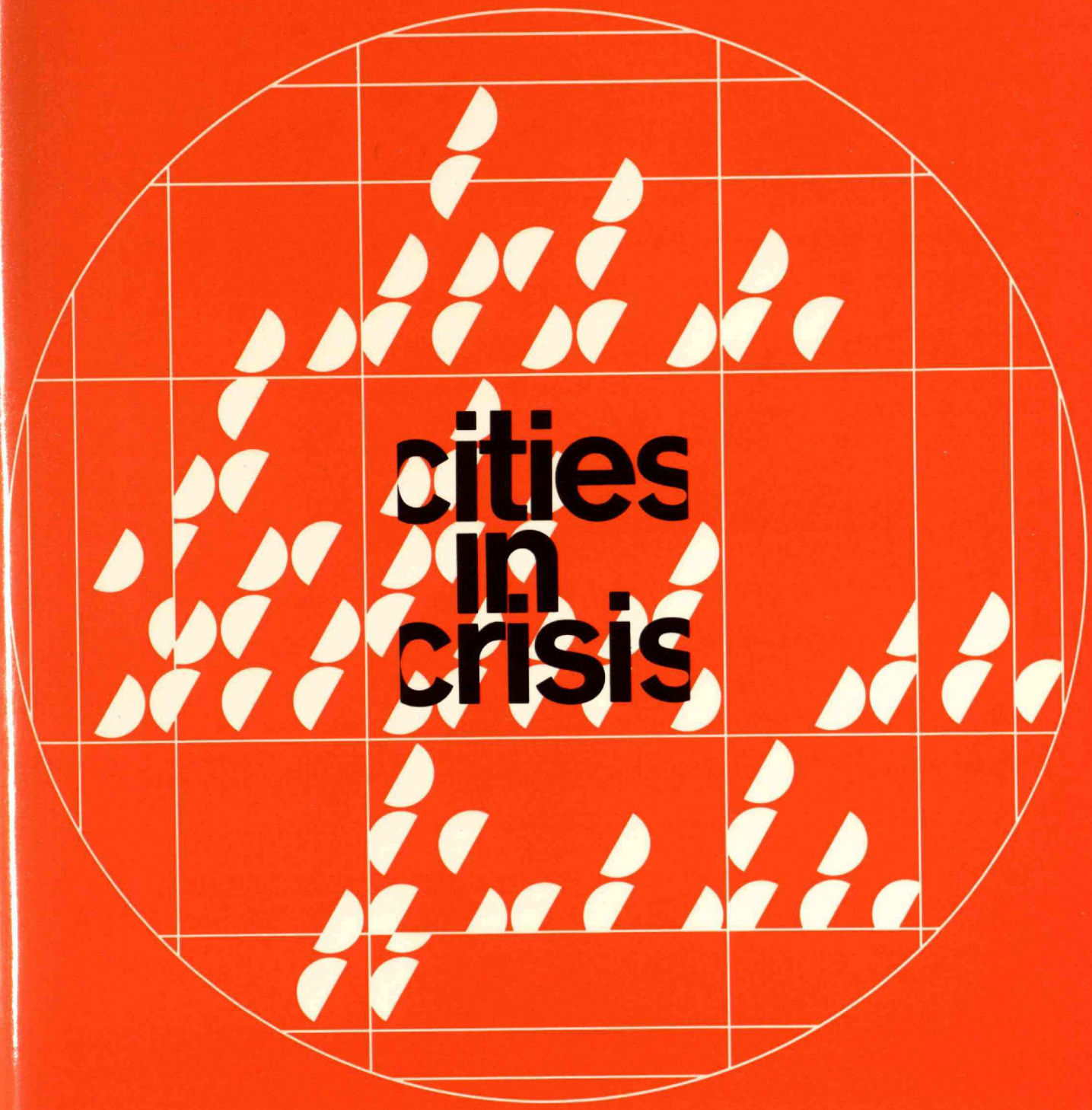

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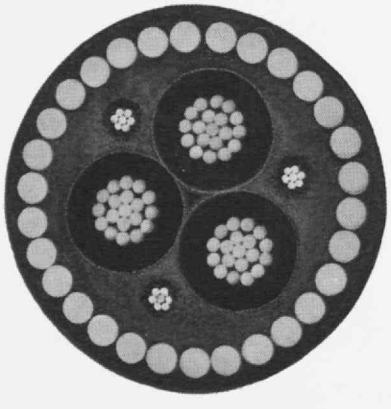

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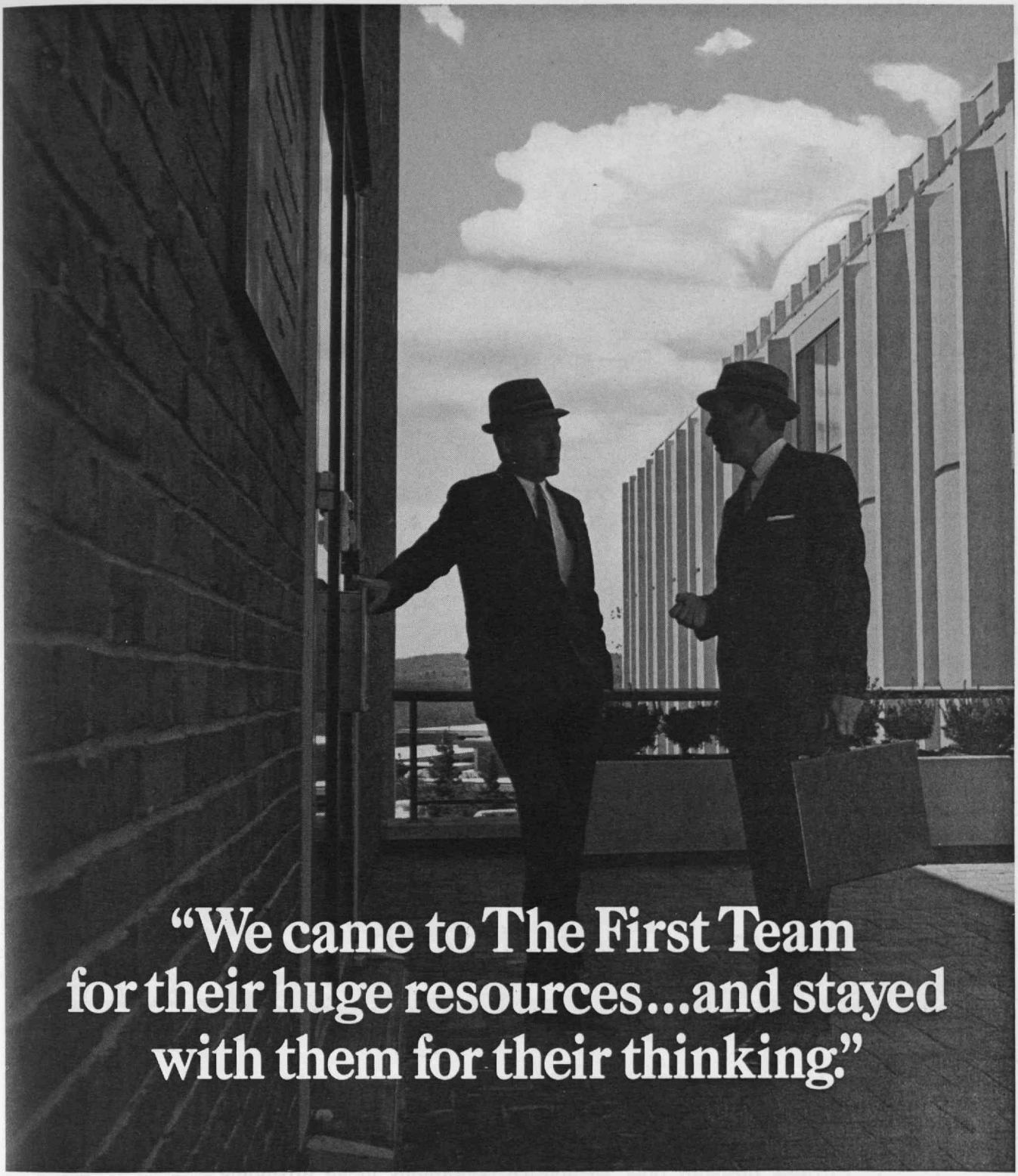

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Next month

In *Technology Review* for February, watch for:
The problems of automotive air pollution, by Dayton H. Clewell, '33
New information on Earth's environment in space, by Norman F. Ness, '55
The turmoil of technology in a folk-oriented Latin American culture (with northern overtones), by Charles H. Savage, Jr.

The cover

The cover design by Ralph Coburn, '47, draws upon the graphic theme for the 1967 M.I.T. Alumni Seminar, for which the papers in this issue of the *Review* were originally conceived.

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January, 1968

Technology Review

Government Review

Daniel S. Greenberg

The Congress and Science

Consider the following:

In each of several past years, the U.S. Government spent $16 billion, give or take a billion, on research and development.

Not a cent of those billions went forth without at least the tacit approval of the U.S. Congress, and, in fact, some considerable portion was started on its way (and even a bit, such as funds for Project Mohole, was stopped) at the instigation of the U.S. Congress.

Nevertheless, among the 535 members of Congress there isn't enough scientific and technical expertise to staff a medium-size technical high school. In the current Congress, which is typical in this respect, the members with professional backgrounds in or around science and technology consist of eight who identify themselves as engineers, all below the Ph.D. level, and five as physicians. (In the last Congress, there was one Ph.D. in engineering—Weston E. Vivian, S.M.'49—but he did not survive the 1966 election.) By contrast, 314 current members cite law as their profession. It can be argued, and with justification, that the professional backgrounds of members of Congress are more or less irrelevant, since the legislative role is a job unto itself for which no particular professional preparation is especially superior for assuring laudable performance. Medical research did all right under the late John Fogarty, a bricklayer whose formal education ended in 12th grade.

Be that as it may, we then come to the question of supporting staff for the Congress. There are no detailed breakdowns on the professional backgrounds of the 10,030 people—from building guards to committee directors—who serve the Congress. But, within the staff ranks, scientists, engineers, and medical men are about as common as congressmen who voluntarily relinquish their seats. Take away a few, and there would be none.

Scientific and technical illiteracy being a demonstratable property of the U.S. Congress, how then we might ask does this weighty participant in government make scientific and technical decisions?

The answer is: Not very well. To which must be added at once that, until quite recently, very few ill consequences flowed from this situation, and there were perhaps even a few advantages, since the Congress, not unmindful of its lack of competence, and ranging between permissiveness and enthusiasm toward science and technology, tended to the practice of shelling out money and leaving the rest to the scientist-laden executive agencies directly concerned with the details. But in recent years, as the relationship between science and government has become richer, thicker, and more complex (*see, "The New Politics of Science,"* Technology Review, Apr., 1967, p. 49), the Congress's inadequacy, both in personnel and organization, for dealing with science and technology has become a minor horror—though one with great growth potential. That this is so is attested to by the fact that the Congress itself, though rarely disposed to stir up the network of established interests that comprises its own internal structure, has, over the past few years, done more organization stirring where matters of science and technology are concerned than in perhaps any other area.

Thus, within the past five years, the House Science and Astronautics Committee activated a subcommittee on Science, Research and Development, chaired by Emilio Q. Daddario (D-Conn.); a House Select Committee on Government Operations came into being under the chairmanship of Carl Elliott (and disappeared following his defeat in Alabama); the Government Operations Committee in each house created subcommittees on government research programs, chaired, respectively, by Senator Fred Harris (D-Okla.) and Representative Henry Reuss (D-Wis.). And the Legislative Reference Service of the Library of Congress created a Science Policy Division, which, though distant from the actual operations of Congress, boasts a fair concentration of professional expertise, including five Ph.D's in various disciplines. In addition, the Congress, though not well equipped with resident expertise, has increasingly reached out to the scientific community for advice. Daddario's subcommittee, for example, has formally contracted with the National Academy of Sciences for studies in the general area of science-government relations, and Harris' subcommittee has held a series of hearings that heard witnesses from many significant areas of science and technology.

A Potential Unrealized

All of these developments are commendable, as well as long overdue. But, once having noted that, it is also necessary to note that every single one of the newly created organizations cited above is, at best, of only potential significance for elevating the Congress's performance in dealing with science and technology. For, in the gooey inner workings of the legislative branch of government, the essential power over the development and employment of science and technology still remains firmly ensconced in an ancient and balkanized committee structure that is staunchly indifferent to any view of the interdependence of science, technology, education, and economic development. What it comes down to is that the newly created committees, such as Daddario's, Harris' and Reuss's, command the broad view; the old committees command the money. Let us examine the system's workings.

When the executive branch formulates comprehensive programs composed of segments involving various agencies, the whole must necessarily be disassembled for submission to various parts of the congressional committee structure. But what emerges from the legislative branch is often a far distance from the original formulation—and, in such cases, the change is rarely a consequence of an assessment of the original design. Rather, it is a consequence of half a dozen separate subcommittees each considering its segment without reference to the whole. Thus, in 1963, the Kennedy administration proposed a far-reaching expansion of financial support for graduate science and engineering fellowships. Offered as a justification was an assessment of future national needs for highly trained manpower. The design called for various federal agencies to underwrite this expansion, with a major role being assigned to the National Science Foundation.

Considering the shaky state of the art in projecting manpower needs, it is possible

that the fellowship plan called for too much or too little in terms of the needs it foresaw and sought to meet. However, it was carefully conceived as a whole, and it is hard to see how it could wisely be assessed as less than whole. Nevertheless, the House Appropriations subcommittee that handles N.S.F. funds rejected any substantial increase for N.S.F. on the grounds that the Foundation had grown too fast. The immediate or far-reaching implications of the effect that this had on fellowship support was considered, if at all, only in passing. Similarly, appropriations subcommittees of the 90th Congress substantially reduced N.A.S.A.'s and the Defense Department's funds for support of academic research, without reference to the impact that this might have on specific institutions, the general availability of government funds for the fields of research that are affected, or even the desirability of supporting these areas of research.

At the heart of the problem is the fact that the executive branch long ago recognized that the substance of science and technology do not conform to agency boundaries. As a consequence, it spent a decade developing mechanisms, such as the White House science office, for harmonizing agency requirements and objectives with the fundamental untidiness of science and technology. Congress, on the other hand, has held to the practice of organizing itself as a mirror image of the organizational structure, rather than the objectives, of the executive branch. In theory, and now and then in practice, the individual actions of congressional subcommittees are harmonized through review by their parent committees and again through the action of the whole Congress. But in fact, while science and technology comprise a grid system that runs through virtually every aspect of the nation's life, Congress still deals with them in bits and pieces, with scarcely any awareness of the whole.

As is frequently the case, the diagnosis comes easy, but prescriptions come hard. There is obviously no one-shot cure for this situation. But, on the part of Congress and on the part of the scientific community, there are many openings for beneficial action.

Toward A Comprehensive View

First of all, Congress would do well to take some steps toward raising its in-house expertise on the peculiarities of science and techno!ogy. The establishment and growth of the Science Policy Division is a wholesome move in this direction. But since the S.P.D., as part of the Legislative Reference Service, works for everyone in Congress, it really works for no one in particular, which is a serious handicap in an organization that places high value on secure personal relationships. (Every congressman has his own fish to fry and he prefers staff collaborators to be close and responsible to him alone.) S.P.D. is evolving into an indispensable source of objective background information. It has the talent and resources to assemble all sorts of disparate and difficult-to-find materials on complex issues, such as it has done on the status of aeronautical responsible to him alone.) S.P.D. is academic science throughout the country. But if the members are to be provided with an educated view of what science and technology are all about, they need somebody right close to them, on their office or committee staffs, to handle the job as a major responsibility. Thus, it would be useful all around, for science, Congress, and the public process, if more persons with scientific and technical proficiency could find useful roles in the congressional staff system.

Since the status system of science and technology accords few points for time so spent (lawyers, nonscience academics and journalists profit professionally from time spent in Congress; scientists and engineers rarely do *qua* scientists and engineers), it might be useful to establish some sort of fellowship or internship program that would create a steady flow of bright young scientists and engineers through the staffs of Congress. It is doubtful that many would stay, but their presence might, if only in a small way, clarify congressional perceptions as to the characteristics and vulnerabilities of the national scientific and technical enterprise. And equally important, such a program would help create cadres of scientists who have an understanding of the working of the mysterious legislative body that so often baffles and frustrates the well-intentioned but often politically naive statesmen of science.

The most fundamental and sorely needed reform has to take place in the appropriations committees of the two houses. Since the powerful subcommittees of these virtually omnipotent committees are here to stay, there is no easy solution to their fragmentary handling of science and technology. Nor, since science and technology are woven through all agency programs, is there any sense in trying to extract them from throughout the executive structure and combine them into one legislative bundle.

But strong encouragement should be given to efforts to make Congress emulate the Executive in seeking a comprehensive view of science and technology. Thus, now and then proposals pop up (and disappear without a trace) for establishing some sort of congressional joint study of science and technology. If well conceived, these deserve the support of those who are concerned with the development and application of the nation's scientific and technical resources. It is hard to get at the appropriations structure, but no efforts should be spared to encourage the occupants of those key committee positions to seek a broad view of the effects that their agency-by-agency decisions have on the whole fabric of science and technology. Encouragement, through letters, personal representation, and public testimony, should especially be given to the development of informal inter-committee consultations. Within the Executive Branch there is currently a good deal of indecisiveness as to the advisability of an annual presidential report on the state of the nation's science and technology. It would be a difficult one to assemble, but as things are now going, it might have a salutary effect on Congress's disposition to dissect that which does not easily survive dissection.

Daniel S. Greenberg is news editor of *Science* magazine. In the last five years he has written extensively on the politics of science.

Science Review

Robert C. Cowen, '49

The World as a Spacecraft

We live on a spaceship. With a finely adjusted life-support system and shields to ward off lethal radiation, it safely carries us on a cosmic journey.

This fanciful view of our planet rather neatly sums up the human predicament. Not even the astronauts can escape our cozy little craft. The survival and well-being of mankind depend on our making the most of earth.

This puts some of the world's big problems into an interesting perspective. From air pollution in New York to hunger in India or the stresses in Vietnam, it subsumes these problems in one overriding challenge—how can burgeoning humanity learn to live and prosper within the confines of earth?

More and more, this forms the framework of discussion for scientists and others who take a long look ahead. It served as such a framework for several participants in the latest of the New Horizons in Science Briefings for science writers—sponsored annually by the Council for the Advancement of Science Writing and this year cosponsored by Washington University.

Famed architect-engineer R. Buckminster Fuller of Southern Illinois University first brought up the spaceship analogy as one of the opening speakers. He used it to point out the need to view mankind's destiny from a global viewpoint, to break parochial thought patterns.

"How many of you," he asked, "think of the sun as going down below the horizon or rising above it and don't think of the earth rotating? How many think of 'up' and 'down' rather than out from and back toward a planet's surface? Such concepts have been built into our language so long ago that the average man can only see himself as a creature on a two-dimensional surface. He can't grasp the cosmic significance of earth."

He then described earth as a spaceship. He outlined the food chains starting with photosynthetic plants that sustain life, the self-renewing atmospheric system that provides a livable environment, the protective shielding of atmosphere and magnetic fields that screens out deadly ultraviolet rays and proton beams from our energy source, the sun.

With all these niceties of balance, he asked, why was man put on the ship without a book on how to run it? This he sees as perhaps the supreme challenge of evolution on earth. Man was given thought power, intelligence. It is up to him to use it to learn the workings of his ship and how to survive on it.

In this, he may suceed or he may fail. To Dr. Fuller, the stresses and strains of today's world merely reflect the fact that this issue now lies in our hands.

"Nature makes many starts," he said. "Intelligent life, man, doesn't have to be a success on earth. There are many other inhabited planets. As he evolved toward intelligence, man was protected by the resilience of earth's system. He had wide latitude for mistakes. Now I think he's come to the end of that cushion.

"Humanity right now has just broken from its egg. It's standing by the broken shell. Now it has to fly. What I'm saying is that you have to take an integrated view of the problems we all talk about—pollution, deterioriation of environment, overpopulation, etc. . . . We have to make people really aware that a ship is a ship and that you have to look out for the equipment. We really have beautiful equipment and are perilously close to the point of no return in ruining the equipment."

Roger Revelle, who heads Harvard's Center for Population Studies, picked up this theme during the closing session. He too used the spaceship figure, pointing out how isolated it is in space.

The other planets of the solar system, as now known, offer no prospect for more than small colonies for explorers on perhaps Mars. The stars are so distant that no one can reach them as far as anyone can see into the future. "This earth," Dr. Revelle said, "is all we've got and we better learn to cherish it. It's probably man's only home."

He added that we can't get rid of anything from this ship to any appreciable extent. Our trash stays with us. Our resources are simply degraded. No material disappears in the process. In degrading the environment, in mining or in creating dust bowls and so on, we are simply homogenizing the surface. We make it more difficult for the thin web of life to exist. By the next generation, Dr. Revelle predicted, we will have greatly modified some 25 per cent of the surface.

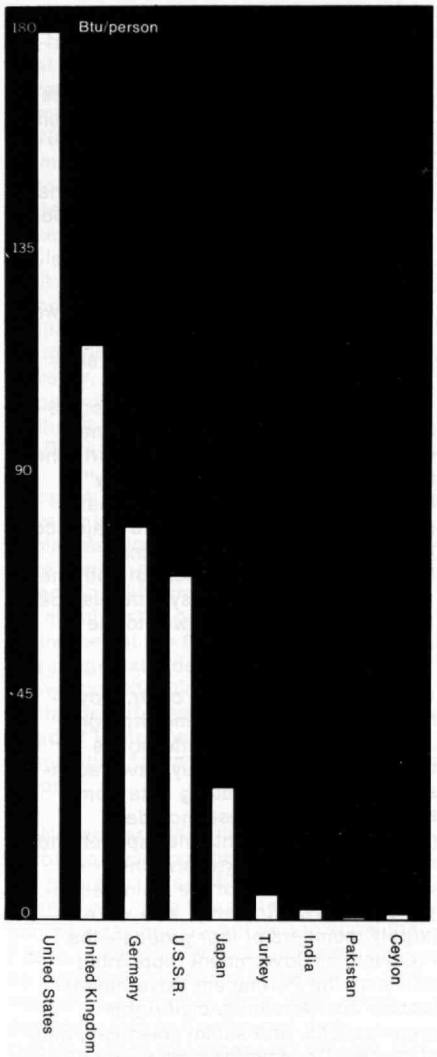
First Class vs. Steerage

Then there's the fast-growing issue of separate classes for the travelers on our ship. A minority of mankind, the northern tier of industrially advanced countries, rides in first-class luxury. The majority, mainly tropical and southern so-called "developing" nations, rides in the deepening poverty of steerage. How long can mankind live together, partly rich but mainly poor?

Harrison Brown of the California Institute of Technology sketched the outlines of this situation, which he has studied in detail. They are familiar to all who follow world trends. Runaway population eats up economic gains in developing countries. Of the world increase of 500 million persons over the past decade, 400 million appeared in the impoverished nations. In rich countries, the growth rates typically run to about 1 per cent. In poor countries they have jumped to over 3 per cent, in some cases to over 4 per cent.

Increase of gross national product is some 4 per cent per capita per year and rising for rich nations. It is 2 per cent and falling for the poor. Food intake per capita has risen in rich countries to something over 10,000 calories a day of primary photosynthetic food crops. That includes feed for meat animals. In a country like India, consumption is down to 2,300 to 2,400 calories of basic photosynthetic intake. That's protein-short diets for many people, starvation for some.

The only thing that can stop the widening of the gap between first-class luxury and second-class poverty is total economic development. Birth control, by itself, is no answer. Even if a cheap,



The figures in the chart above, showing the per capita consumption of energy in various parts of the world, emphasize the differences between technological "haves" and "have-nots." (Statistics: Energy Study Group for the Inter-departmental Energy Study, Office of Science and Technology, 1966)

safe, effective measure were found soon, it would take a generation or more to persuade enough people to use it to do any good.

Likewise, to try to boost food production by itself is futile. This would mean new seeds and farming methods worked out for local conditions by presently nonexistent research stations. It would mean a chemical industry for fertilizer production and new roads and equipment for farmers. It would mean educating an army of technicians to educate farmers in the new methods. In other words, it would take a generation of wide economic development.

The poor countries can't do this for themselves. They haven't the capital or the skilled manpower. It will take, in Dr. Brown's view, a concerted international development program several times bigger than total foreign aid from all advanced countries in the past.

He doesn't have very much hope that such a program will get started soon. He doesn't even see the rich nations viewing the problem in these terms. Yet he feels it is urgent that these countries grasp this perspective. The alternative, he said, will likely be mutiny within our world ship.

"We need to change our whole outlook and change it pretty rapidly," he said. "We need massive technical aid on a scale never attempted before. There is no such thing as instant development. The time scale is that of education—a generation, say 25 years."

He added, "I have the feeling that unless there is a complete reversal of our present attitudes, we haven't seen anything yet. More and more in these countries I hear 'we have little to lose by violent revolution.' We are going to have Vietnams all over the world. . . . The rich can't isolate themselves on their islands from the poor. . . .

"Yet we have the technology to eliminate poverty. Given the right kind of leadership in the world, the right attitudes among ourselves, we could eliminate poverty and hunger in a couple of generations and get rich doing it. Selfishness stands in the way. Yet if we do have a change of heart, the potentialities for mankind are enormous."

Visions of one world, one family of man, have inspired thinkers for millennia. Today, humanity's crowding, high-speed communications and transport, pressure on restricted resources, and the need to care for our environment have all made one world the biggest single fact in our lives. Can we rise to this challenge? Can we learn to live together within our small yet magnificent spacecraft? Or will we be known as the technically clever, socially stupid generation?

Robert C. Cowen, '49, is Science Editor of *The Christian Science Monitor* and President of the National Association of Science Writers.

Book Review

Joseph Mindel

Ataxia in the Body Politic

The exploration of a single episode in a political scenario enables the authors of *The Moynihan Report and the Politics of Controversy* (The M.I.T. Press, Cambridge, 493 pp., paper, $3.95) to describe aspects of the operations of government in illuminating detail beyond the capacity of even the most assiduous reader to uncover from the daily news that is found fit to print. At the same time, however, Lee Rainwater and William L. Yancey, Washington University sociologists, avoid facing the implications of a conclusion they barely draw explicitly.

The cinematic analogy is not inappropriate. Boldly in the foreground is the protagonist, Daniel P. Moynihan. The action takes place in 1965-1966, when he was a U.S. Assistant Secretary of Labor and Director of the Labor Department's Office of Policy Planning and Research. (The finale is not revealed by noting that he is now Director of the Harvard-M.I.T. Joint Center for Urban Studies.) The theme is major and controversial—civil rights and equality for Negroes. The plot develops out of inner logic, yet with no lack of surprise. The confrontations arise from genuine differences, and since no participants are unequivocally evil or virtuous, we are offered no easy resolutions.

In March, 1965, Dr. Moynihan and his staff completed a report, "The Negro Family: The Case for National Action," which has come to be known as the Moynihan Report. It was written, not as a public document, but rather as a policy paper for the highest levels of administration. Initially, 100 copies were printed, and the report was distributed to only a few individuals in the Department of Labor and the White House.

In the report, Dr. Moynihan argued that Federal legislation and Supreme Court decisions had established the legal basis and some administrative machinery for combating formal and covert discrimination against Negroes. But removing barriers to civil liberty did not provide equality, especially not in the new sense in which equality was being interpreted. "It is not enough that all individuals start out on even terms, if the members of one group almost invariably end up well to the fore, and those of another far to the rear."

The bitter fact was that in recent years the circumstances of Negro Americans were worsening, not improving. Equal opportunity was no longer sufficient; equality of results must be ensured.

Such equality is practically unattainable by most Negroes, because centuries of discrimination, injustice, and uprooting have impaired the structure and institutions of Negro society. And this leads finally to the fundamental problem, for, "At the heart of the deterioration of the fabric of Negro society is the deterioration of the Negro family."

The causes are found in the peculiarly inhuman character of American slavery, the pernicious effects of Reconstruction on the Negro family, and the continued destructive consequences for the Negro man of urbanization, unemployment, and poverty. Negro men, and therefore Negro families, are trapped in a cycle of disadvantage—failure—greater disadvantage, that they are powerless to break.

In order to focus attention on understanding of the problem, Dr. Moynihan decided not to suggest solutions, concluding the report by defining a policy of bringing "the Negro American to full and equal sharing . . . in citizenship" by means of Federal programs that "shall be designed to have the effect . . . of enhancing the stability and resources of the Negro American family."

On June 4, 1965, President Johnson delivered at the Howard University commencement a speech drafted by his assistant, Richard N. Goodwin, Visiting Professor of Public Affairs at M.I.T., and Dr. Moynihan. In his talk, which followed the statistics, analysis, and conclusions of the Moynihan Report, the President described the "next and more profound stage of the battle for civil rights." This would be concerned, not with legal safeguards, but with jobs, housing and education to strengthen the Negro family and provide it with resources for achieving meaningful equality in American society. The President announced his intention of calling a White House conference on the theme, "To Fulfill These Rights," which would study the problem and propose solutions.

After such a rational beginning—define the problem, search for causes, develop remedial measures, and institute action—after so eminently sensible a beginning, what might not have been achieved? But as it turned out, there was little achievement and much public quarreling. Professors Rainwater and Yancey state that to sociologists, psychologists, and other professionals in the field there was little that was new or startling in the Moynihan Report. Then how, they ask, does "nothing new" become the basis of a new national policy and also the center of a major controversy? Their book documents thoroughly the development of both the policy and the controversy, but this does not really give us an answer to the question.

Going back to the origin of Dr. Moynihan's ideas, and continuing through June, 1966, when the White House Conference was held, they have reconstructed the events, using data from several sources. These included government documents; newspaper and magazine articles; extensive interviews with some 60 of the main participants in the controversy, who were largely members of four groups—the Presidential Government (appointed officials), the Permanent Government (career civil servants), civil rights organizations, and social scientists; and, of course, Dr. Moynihan, who not only spoke candidly and at length, but made all his files available. The texts of the Moynihan Report and the President's Howard University speech, as well as other documents and articles, are included in the book.

Since the authors are concerned not only with the sequence of events but with their meaning, with the motives of the participants as well as their actions, the story is marvelously complex, filled with inconsistencies in a most dramatic—I was about to say, realistic—fashion. So, for example, the President's Howard University address that was interpreted

by some as calling for more Negro self-help, with less reliance on government aid, was seen by others as promising increasingly massive Federal Programs of social and economic assistance for Negro families. So, as another example, the existence of the Moynihan Report was first rumored; then its contents, but not its authorship, were leaked to the press; then it was made available to those who knew to ask for it; and finally, the document written as a confidential policy paper was made public, more than 70,000 copies being printed eventually. By this time, however, the White House was no longer willing to claim the report, so that it became an official stepchild of the Department of Labor.

To speak, as the authors do, of controversy is in a sense misleading. Public reactions to the Moynihan Report were almost entirely negative, the objections differing mainly according to the membership of the critics in one or another of the four groups listed above. The range extended from criticisms of oversimplification and misuse of data to charges of blaming the Negro instead of white society, and providing ammunition for racist claims of Negro inferiority.

By November, 1965, the executive director of the planning conference for the future full-scale White House Conference was able to amuse the participants by saying, "I want you to know that I have been reliably informed that no such person as Daniel Patrick Moynihan exists." In June, 1966, when the White House Conference met, Daniel Patrick Moynihan was present, but silent, and in a room full of literature on fulfilling the rights of Negroes, "The Negro Family: The Case for National Action" was absent.

Yet, despite the apparent failure of an enterprise that began with such promise, I think it is no exaggeration to assert that the problem of Negro rights and equality cannot henceforth be approached seriously without reference to the fundamental issues raised by the report.

There may be another moral in the implications of an observation the authors make casually in passing. From first to last, the people involved were all formally dedicated to securing equal rights for Negroes. There were no segregationists, no white supremacists, no Ku Klux Klan leaders, no Mississippi sheriffs. Yet these good people found it impossible to move together, to co-ordinate the thoughts and actions of individuals in a group in order to achieve a common goal.

"The body politic," Rousseau wrote, "like the human body, begins to die from its birth, and bears in itself the causes of its destruction." If the end comes in the last third of the Twentieth Century, what form will it take?

"Some say the world will end in fire,
Some say in ice.

"This is the way the world ends
This is the way the world ends
This is the way the world ends
Not with a bang but a whimper."

Or will the end be an ataxic frenzy, a desperate unco-ordinated twitching of the limbs of the body politic?

In Brief

Scientific Instruments in Art and History (Viking, New York, 208 pp., $18.50) by Henri Michel is a beautiful book, not only for its contents, but for its design as well. The excellent color photographs, large enough to show details, are accompanied by one-line captions, while more detailed, though still brief, explanations are placed together at the end of each chapter.

The book is concerned with early instruments, which the author, a historian of science, has grouped in chapters according to their use: measuring the earth, the heavens, time, or the properties of matter. There are sextants, compasses, waywisers, globes, armillary spheres, orreries, nocturnals, microscopes, thermometers—more instruments than can be listed, all in shining brass, polished wood, engraved leather, and clear glass.

It will be many a long day before this book is matched by anything retrieved from a central computer memory.

New from the M.I.T. Community

Protest and Prejudice, Gary T. Marx, Research Associate, Joint Center for Urban Studies of M.I.T. and Harvard. New York: Harper and Row. A five-year research project conducted by the author at the Survey Research Center of the University of California (Berkeley) reveals that most Negroes, though overwhelmingly committed to social change, also maintain their commitment to nonviolent methods.

The Hobby Shop, Morton Grosser, '53. Boston: Houghton Mifflin Company, $4.95. A novel about the self-searching of a physicist left alone upon the death of his wife. He returns to his childhood pastime of model-airplane-building with results involving both his professional and personal lives.

A Manager's Guide to Computer Processing, Roger L. Sisson, '48, and Richard G. Canning. New York: John Wiley and Sons, Inc., $6.95. A nontechnical explanation of how computers and computer-based information systems are designed and organized.

Difference Methods for Initial-Value Problems (second edition), Robert D. Richtmyer, Ph.D.'35, and K. W. Morton. New York: Interscience (John Wiley and Sons), $14.95. The development of numerical methods for automatic machines, with emphasis on the solution of partial differential equations by difference methods.

Carbonatites, edited by O. F. Tuttle, Ph.D.'48, and J. Gittins. New York: Interscience (John Wiley and Sons, Inc.), $22.50. A synthesis of present knowledge of the genesis and manner of emplacement of carbonatite complexes, including data on rare minerals found in them.

Joseph Mindel is a member of the M.I.T. Lincoln Laboratory; he was formerly Chairman of the Department of Science in the New York City public schools, and he is a frequent contributor of manuscripts for television documentaries. The notes "New from the M.I.T. Community" have been prepared by the editors of *Technology Review.*

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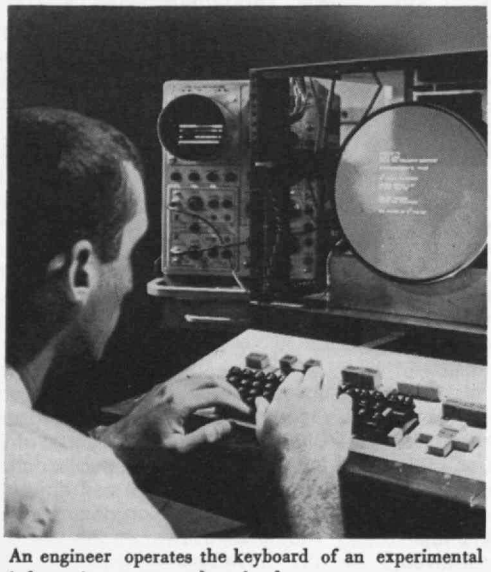

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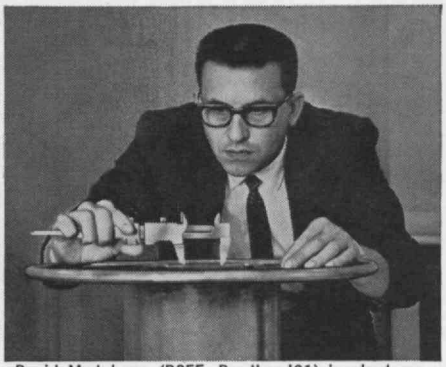

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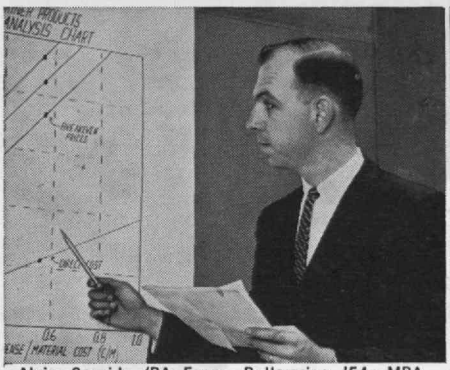

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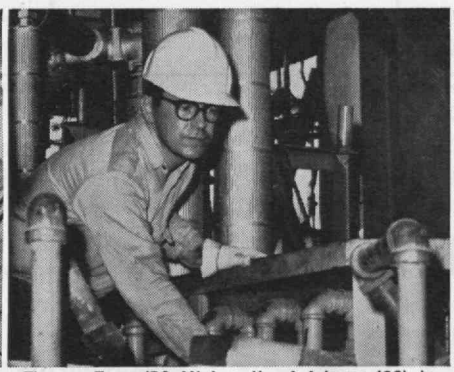

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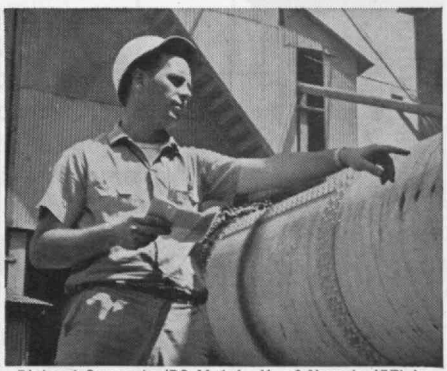

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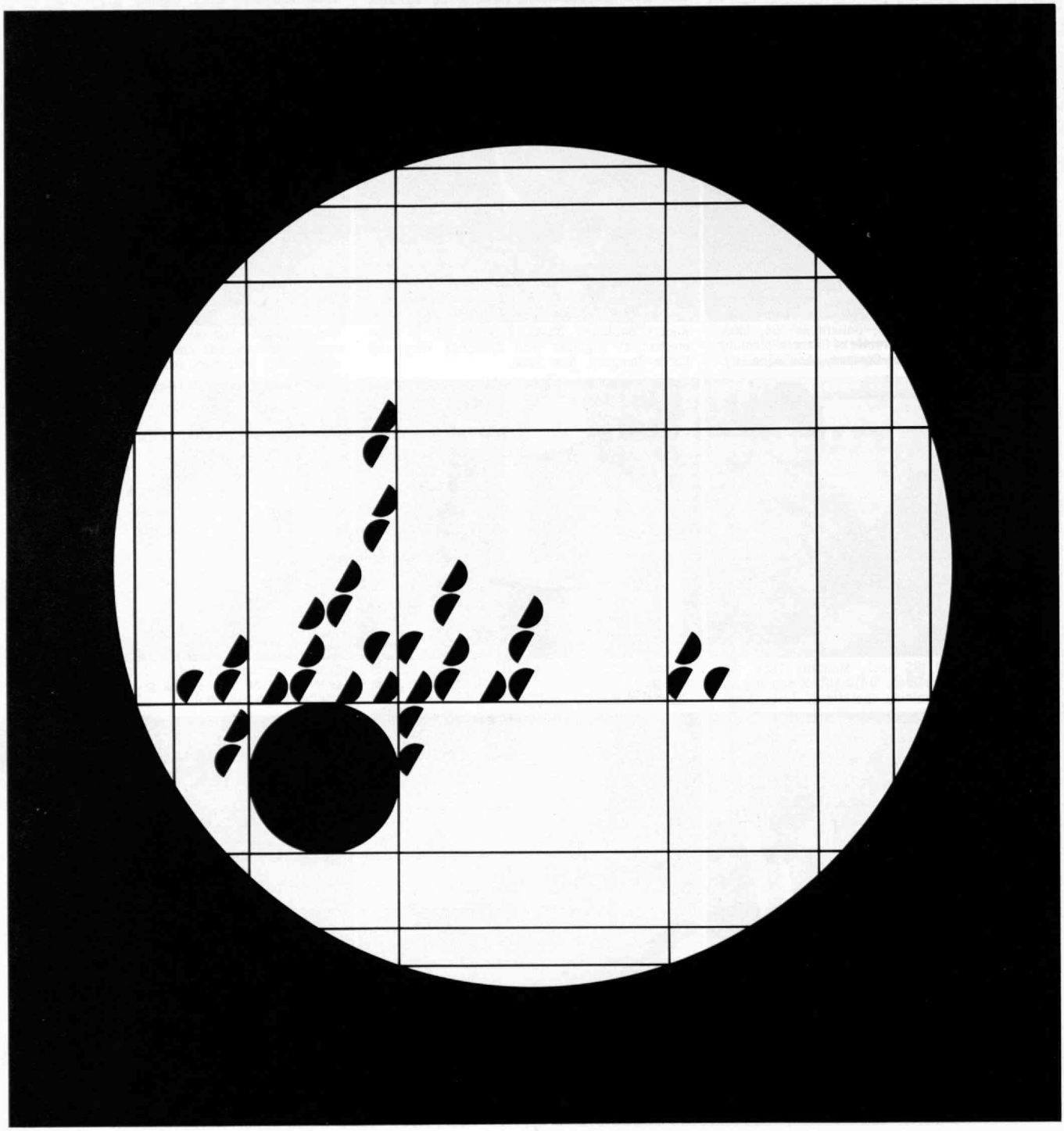

The invisible walls that divide our cities hold the certainty of fear, hate, violence, and destruction

Leonard J. Fein

The Costs of Freedom Or a Sea of Flame

In the summer of 1967, while Newark and Detroit exploded, I found myself in Israel, in the aftermath of that country's earlier rendezvous with violence. Because my response to what happened—and is happening—in our own cities is drawn from my experience with Israel, and most particularly my summer's visit, it is there that I begin my comments.

I managed, in the course of a very brief stay, to visit most of the areas which Israel now controls, somewhat to its own surprise. I stood on the Syrian Heights, and in 8,000-year-old Jericho, and in the Gaza Strip, and in the Church of the Nativity in Bethlehem. But again and again, it was to Jerusalem that I was drawn, and especially unto its Eastern part, to which, over 14 years of earlier visits, I had been denied access. What attracted me was not, however, my new ability to visit hitherto forbidden places, but rather the wonderment of finding this delightful city whole again. The Jerusalem I had known before was a city with a wall in its heart, with streets which ended suddenly, illogically as they came against that wall, with guns and barbed wire and no man's land.

Jerusalem's wall was not only a physical boundary. It marked off political and economic jurisdictions as well, and, even more important, psychological perspectives. Those who lived on either side of it knew little of the other side and its inhabitants, recognized no names or faces but only an amorphous alien mass.

Today the wall still stands, but it is no longer boundary. In two fleeting days of violence, the wall was symbolically demolished, and now, where once a street would end, ancient gates within the wall have been reopened to permit free passage. Though there are many problems yet to be overcome, Jerusalem at last deserves its name. The Hebrew for Jerusalem—Yerushalayim—translates as "the city of peace," and *shalom,* the word for peace, derives in turn from *shalem*—whole, complete; hence Jerusalem, the intact city.

The point is, I should imagine, by now clear. The walls that divide America's cities are no less palpable for their being invisible, no less pathological for their being products of our minds rather than our hands. It would take a peculiar myopia to laud our current state of civic health. I submit, to start with, that the pathology we face is not within the Negro community, but rather in the walls which so distinctively and decisively mark off black from white and rich from poor.

What is the nature of those walls? There was, in last spring's Jerusalem, one passage through that city's wall, called the Mandelbaum Gate. In order to pass from Israel's Jerusalem into Jordan's, it was necessary to produce papers attesting that you were not Jewish. The analogy is plain. In order to pass from the ghettos of our cities into their suburbs, it is necessary to produce papers attesting that you are not really black. That has been the American tradition, and, by and large, it remains the tradition today even as we pretend to undertake vast programs of social reform. The message of white society to the blacks—of the best of white society—is simple: If you can manage to distinguish yourself from your brethren, if you can demonstrate that you are not lazy, shiftless, given to violence, aggressively sexual, illiterate, drunk, then, with some reservations, we will let you in. Remember, however, that when you enter you must not look back. If you must invite your old friends to visit you, make certain that you don't invite too many at one time, and that none of them is blacker than you. Otherwise, we shall begin to suspect your own credentials. In fact, it would be best if you didn't seek out your old friends at all, for now that you can live with us, of what need and of what use are your yesterdays to you? You have been graced; do not jeopardize our charity. We promise, after all, to be color blind, so long as there are not too many of you, and if you in turn promise only to forget your past, to be a cultural amnesiac.

Our tradition, then, is simple. The urban walls are permeable, but only permeable selectively. Before

we are prepared to offer passage through, we insist on proper accreditation—education, skill, accent, clothing, friendships. The tradition has been viable because all along we have found enough Negroes, either desperate to escape the horrors of the ghetto or convinced somehow that white was right, to satisfy ourselves that we were doing justice.

And now at last our discreet charity is being questioned. We are informed, with words and cries and fire and death, that our comforting tradition will do no more, that the walls must be torn down in one massive stroke, that we have not the right to appoint ourselves guardians of the passage. We are told that our simple ethic, holding that any man who could deserve our world would be welcomed to it, and even our more elaborate ethic, holding that we had the duty to help others deserve our world, is cheap and insufficient, patronizing—unacceptable.

I do not know that I can reliably interpret the message of black power, or of the riots, since I am not certain that I understand them. But I think we must, however frustratingly and insufficiently, try to comprehend what the black man is saying. Slogans and riots are ways of saying something, and we ignore the meaning, as we are tragically discovering, at our peril. We would have preferred a more reasoned argument, a more conventional effort at communication. That would have saved much anguish and would have been more straightforward, far less cryptic than the slogans and the violence. Yet one need not be an apologist for violence to suggest that the rational message was, indeed, broadcast for many years, but that the relevant audience simply wasn't listening, that even today, the most relevant audience has its attention riveted on other matters.

What is the message? More properly, what are the messages?

First: It will no longer do to demonstrate our justice by pointing at Jackie Robinson or Sammy Davis Junior or Ralph Bunche or Thurgood Marshall. All that is too painless for the white and too trivial for the Negro. If the walls are to come down, the tool that is required is a sledge hammer, not a scalpel. That means, empirically, that the level of America's commitment to full equality must be factorially increased, and now.

Second: The Negro is a member of a community. We cannot offer him access to the fruits of our economy only if he betrays that community. We must not seek the color-blind society, the society which finds Negroeness irrelevant, but rather the society in which black is seen but not rejected. Blackness is no longer to be regarded as an unfortunate condition which men of fairness will ignore; it is not to be seen as unfortunate at all, but simply as one of the defining characteristics of the Negro.

Third: Because of our own behavior, we have made blackness into the essential characteristic of the Negro. We have, in one way or another, made so much of blackness that for the present it is the central facet of the black man's self-perception. Much as their Jewishness became more salient to Jews during the recent Middle East crisis, much as their Italianness was more relevant to the Italians during last year's floods in Florence, so Negroeness has become more salient to the Negro during our continuing racial crisis. Unless and until our problems approach solution, black men will be unable to be casual about their blackness. They will make more, rather than less, of being black.

We find this distressing. The editorial writers and columnists complain that the emphasis on blackness can only set men apart, divide and endanger our national house. But there is another component to our distressed response. Most white men found it more comforting to deal with the Negro when it could safely be assumed that there was nothing the Negro wanted more than to be white. It was not very long ago that Negroes took elaborate

steps to be agreeable, to straighten their hair and lighten their skin and adjust their behavior. This was reassuring, for it clearly implied that we were on top and they on the bottom, that our policy of selectively admitting the whitest Negroes to our own institutions was sensible, both from our perspective and from theirs. Now the Negro message, the message of a rapidly increasing number of Negro militants, is that they want up, not in. The Negroes have come to understand that the path to progress is not to lose your identity but to make the most of it.

It might have worked the other way, had we been serious. We had said that we would admit the black man if only he was not too black. But most of us only saw the blackness, not the man. The Negro in our eyes was black until he could prove that he was white, and the proof had to persuade a skeptical jury. Now, when the Negro has seen his blackness mirrored in our eyes, when he has learned so thoroughly what we have taught, that first and foremost, before he is a teacher, or a priest, or a scoundrel, or a poet, he is black, what right have we to complain?

The Seeds of Fear and Hatred

These several messages add up to this: In the short run as well as the long, it will cost more, infinitely more, to try to save the walls than to destroy them. We had thought, for reasons somewhat obscure, that the walls protected us, made our society orderly and sensible. It now becomes apparent that the walls destroy us, make our society violent and fearful. The real cost of the rioting is not in looted property or gutted buildings but in the seeds of fear and hatred which they spawn. For a brief moment in the early 1960's it seemed as if the Negro had learned to exploit the white man's strength—his residual morality, his sense of guilt, his sometime decency. But the results were wanting, and now it is his own strength and the white man's weakness that the Negro seeks to exploit—his numbers in our major urban centers, our fear, his newfound pride in color, our ability to be blackmailed into making available, on a wholesale basis, the life that reason could not and did not induce from us.

All this amounts, I suppose, to saying that we brought it on ourselves, that as ye sow, so shall ye reap. Yet I do not want to add to our already overburdened sense of guilt, nor do I want to suggest that because the riots can be explained, they must also be accepted. I want instead to suggest the lessons that need to be derived from the present crisis.

The first and most important of these lessons is that the pathology which threatens us today lies not within the Negro community, nor within the Negro family structure, but within the walls which white America has fashioned. It is true, of course, that all is not well within the ghetto's walls. The rate of illegitimacy is high, the level of education low, there are too few entrepreneurs and too many crimes. The question that must be asked is how these facts are to be interpreted. In the conventional interpretation of white liberals, the failings of the black community result from centuries of oppression; the scars of slavery are not yet healed, and it would be foolish to suppose that the removal of old barriers can lead to sudden and dramatic improvements of the patient. What we need, according to this theory, is massive investment and Jobian patience. Then, in due course, the pathologies will fade away.

But there is another theory, more simple, more direct, and, in my judgment, substantially more useful. This theory holds that we are so far from having removed the old barriers that we cannot know whether the problems of the ghetto result from yesterday's injustices or from today's continuing oppression. Make a leap of faith, the theory argues; assume that it is your own behavior, and not the Negro past, which debilitates the black. Change that behavior—and then, if you were wrong, follow the change with compensatory investment.

It might seem, at first blush, as if there were little empirical consequence attached to these two

different explanations of Negro performance. But I think I can demonstrate that there is, indeed, a substantial significance in our choice of theory, and that, by and large, the preference for the first theory, which is more comforting to us, has been in no small measure responsible for the tragic position in which we now find ourselves.

The first theory depends upon the assumption of Negro inequality. That, of course, is not the way it is put—not in educated circles; instead we say that it would be cruel to expect the Negro to behave like the white man after all the white man has done to the Negro. In other words, for the time being, the Negro is unequal. If, further, you assume that that inequality is not genetic, that it is largely the product of white malfeasance, then it follows that white America has a moral obligation to try to repair it.

The fact, however, is that we now have a good deal of evidence that indicates—I am almost prepared to write "proves," but that's a risky word—that removal of external barriers to Negro progress, if undertaken honestly and massively, produces almost immediate results. Further, we have good evidence that the failings of the Negro result primarily from our expectations of Negro failure and from our tendency to define as a failing anything the Negro does. It is in such action, rather than through programs which make elegant promises to black men on condition that they set their own house in order, that the social investment is best made.

Very briefly, let me cite some of the evidence I speak of. To support the proposition that Negro progress, as white culture defines progress, is spectacular just as soon as external impediments are removed, I know of no better example than the Upward Bound program. That program, sponsored by the Office of Economic Opportunity, identifies bright youngsters in poverty who seem to have college potential despite poor high school performance, occasional police records, and the like. It offers them intensive summer academic programs, and tutorial assistance throughout the year. Not long ago, I completed an analysis of the results of this program, which last year included 5,000 high school seniors. In a time when the newspapers are so full of reports of failure, it is downright exciting to learn that over 4,000 out of those 5,000 seniors entered college this September, the majority of them in four-year colleges.

Now the conventional figure for college attendance among children of the poor is 8 per cent. Here we are talking about 80 per cent. Even if we correct for biases in the selection process—and there was a great effort to avoid picking students for this program who were obviously able to make it on their own—the figure is startling.

What happened? How is it that so many students, hitherto identified as failures and as troublemakers, are suddenly doing so well? I suggest that what distinguishes Upward Bound is that it offers the student a believable opportunity. It isn't full of vague promises about equality or affluence. It says simply that you have been selected because you seem to have what it takes to succeed in college, and, if you work furiously hard, we are pretty sure you will make it—and we're here to help.

When I first began to consult to Upward Bound, I was cautioned to be on the lookout for student apathy, hostility, withdrawal, alienation. But try as I would, I found no evidence of such unhappy phenomena. The students were working just as hard as they could, because nobody was putting them on.

In brief: It makes no sense to legislate equality of opportunity if the marketplace does not provide the opportunity. Of what value is open housing legislation if the housing isn't there? Of what use is equal employment legislation if the jobs are not there? You may answer that before the jobs are there, the training must be there, that industry cannot be expected to provide employment for those

who lack the skills. And I will reply that until there is some real evidence that industry will provide the jobs once the skills are there, no one in his right senses will see much point in acquiring the skills. Thus far, our promises have not been quite believable, largely because we were prepared to keep our word only if the numbers of jobs or houses we were asked to make available were not too large. The need today, the urgent need, is for programs to match our promises. Once such programs are developed, we find that the heritage of slavery is overturned in very short order.

I asserted earlier that the so-called failings of the Negro result in part from our expectation of Negro failure. As Shaw put it, we condemn a man to be a bootblack and then go on to prove his inferiority by his occupation. Here there are two complementary bodies of evidence to support the assertion. In several experiments, teachers were informed that certain children in their class were retarded, and that others were above average in intelligence. A curious result ensued. The supposedly retarded students performed poorly *on standard tests* by the end of the semester, and the supposedly bright students performed very well. This is curious because it makes no difference at all whether we have told the teacher the truth. Students the teacher perceives as especially bright get more of her attention and support, and students the teacher expects to do poorly get short shrift from her. It is the perception of the teacher, and not the innate capacity of the student, which is the controlling variable. It is difficult to succeed if no one expects you to succeed, and maintenance of the notion that Negroes are deeply disabled by their past breeds the expectation that they will not succeed.

My final suggestion was that the apparent failings of the Negro result, in part, from our own tendency to define failure in terms of Negro behavior. The evidence here is more impressionistic than I should like, but let me suggest the following for your consideration. Substantial numbers of Negro children grow up without a father in the family. The conclusions to be derived from this seem clear—fatherlessness is disrupting, breeds delinquency and disorder. Yet we now find some reason to suspect not the fact, but the conclusion. It is possible that fatherlessness, in the Negro culture, does not have quite the brutal consequences it does for whites. Research by Charles Willie in Washington, D.C., shows that family disorganization is the major cause of delinquency for white children, but not for Negroes. Negro delinquents come from poor families; as Negro income increases, no matter what the state of family organization, delinquency decreases. More elaborate research currently under way at Ann Arbor indicates that there are no important empirical correlates to Negro fatherlessness, that it may well be—may be, mind you—that the tears we shed for this phenomenon are wasted, no more relevant than bemoaning any other cultural pattern which differs from our own.

What has all this to do with our present despair, with black power, and riots and the rest? Simply this: The rioting and the Student Nonviolent Coordinating Committee's recent obscenities are only the incontinent pustulations that ooze about the base of any wall. Cities are not meant to be divided, and, so long as ours remain bisected, we can expect no less. It is not black power which causes riots, but the moral insensitivity of those who build and maintain walls but pretend they are not there.

Black power itself is, if anything, a reasonable response to the predictable failure of integrationism. Mass integration could not work, because the white community was not prepared for it, and selective integration could not work, because blacks could no longer stand for it. Black power was, and is, a way of trying to organize the black community to gain its due, not unlike the creation of the labor movement 50 years ago. The essential difference is that the opponent of the labor movement was always clear. Labor had to organize to gain its due from management. The opponent of the black man is hardly clear. Is it all whites? How can the Appalachian poor be held

responsible for the black predicament? Is it then only the bigots? But who is to say, in 1967, which of us is still a bigot? Is it, perhaps, only the white rich? Yet the major support for what progress we have known has come from the rich, and the most vitriolic opposition from the lower-middle classes.

Hence black power is necessarily confused, searching for an enemy with which to join battle, sometimes accusing all of us, sometimes groups within the whole. It is not pleasant; indeed, it is embarrassing to watch the search, with all of its confusion and mistakes; that there is a battle to be fought cannot be doubted.

But we should be sadly mistaken were we to believe that black power is a slogan addressed primarily to the ears of whites. The staying power of the slogan is that it says quite as much to blacks as to the whites. What it says is that the blackness which the white man saw as badge of shame is really mark of honor. It distinguishes the unjustly oppressed, and those who are oppressed are always superior to their oppressors. It suggests that black men will succeed as they assert themselves, not as they seek to escape their blackness. It says about blacks, in short, what every other ethnic group in the United States has always known: The way to move ahead in this society is to organize, to move together as a group. Piecemeal movement will not work.

This may seem rather odd. We are asked to disregard the Negro's Negroeness just as he has decided to assert it. That which is supposed to make no difference to us makes a major difference to him. But such a message is not really very strange. Put somewhat differently, it reads, "Our being Negro is our business, our being men is yours. Since you for so long have chosen to insist upon our Negroeness, telling us that we should ignore it, that we should think of ourselves as unhyphenated men, we do not find it strange at all that now we turn the tables. It is you who need to see us as men, and we who need to see ourselves as black. In fact, we are convinced that only when we see ourselves as black, when we have both pride and power, will you be able to see us as men. If, along the way, we cause you some unpleasantness and much uneasiness, we would be happy to consider any alternative solutions you might propose—except for yesterday's solutions, because they were manifestly wanting. In the meantime, we shall continue to praise ourselves, to say what we have to say about you—in short, to tell it like it is."

To See the Negro as a Man

I find the message wholly understandable, and largely plausible. If, then, I am constrained to ask how we may come to see the Negro as a man—how, that is, we can tear down the walls—I find only two alternatives. The first is to do what we have never done before, to fulfill the promise of integration. That would require us to obliterate the barriers that now divide us. Most immediately, it would require an immediate metropolitanization of our school systems, even if such a step were to involve some qualitative sacrifice in the educational excellence of white suburban schools. I am not sure that that is necessarily included in the price, but it may be. I am quite sure that unless we are prepared to make that sacrifice—that is, to undertake massive integration even where it impedes national efficiency—then we are left with only one alternative.

The remaining alternative is as costly to our pocketbooks as massive integration would be to our psyches. For, if we are not prepared to demolish the walls, then we must pay to make them irrelevant. Making them irrelevant means making what is available on either side essentially equivalent to what is available on the other. When the walls no longer serve as economic, political, educational, and medical barriers, then they will be viable. Then men on either side will be able to exercise free choice about the social meaning of the walls, and then they will no longer exact their psychic pounds of flesh.

To ignore the price of our commitment is to fall victim to that special illness I have elsewhere labeled moral hemophilia, whose victims bleed for mankind at the slightest provocation, but whose indiscriminate hemorrhaging leaves them weak and ineffectual. To retain the walls is to sustain the riots. Tomorrow, or the day after, or the day after that, we shall have to come to terms with the fact that it is for the Negro to decide, and not for us, how much his Negroeness shall matter. For us, there is the massive task of learning how to see the Negro as a man.

I am not optimistic about our ability to sustain the effort, nor about our readiness to pay the necessary price, which I am bound say will be much higher than we have yet dared to imagine. I know of no quick answers, no simple remedies. But we are so far from having taken the beginning steps that I cannot now concern myself with final answers. It is the proximate response which we now must seek. Yet if it is the truly open society that we seek, and an end to bloodshed, we cannot drape the walls with tinsel and suppose the job is done. As we have seen, the tinsel merely feeds the flames, reminding all of the ambivalence of our commitment.

As a blueprint for action, the slogan of black power is both fatuous and misleading. But as a revolutionary goal it makes good sense, and it is fully within the American commitment to pluralism. When black power is read to mean "get whitey" it is wasteful and dangerous; when, however, it is read to mean that only as black men band together, impatient with the crumbs from white men's tables, insisting on their due, will this nation move towards redemption of the promise, it makes good sense.

Power, after all, means finally the ability to control your own environment. Only the powerful man, the autonomous man, the man who has options and can choose among them, is truly free. That the Negro seeks black power is no surprise. What is more surprising is that the white man has eschewed that same autonomy, that same power. For surely, so long as white men respond and choose only when others force them to, they are not powerful, they are not free. We have yet to fully recognize the options, to understand that the costs of decency, although a hundred times as high as we have thought, are but a fraction of the costs of our futile efforts to maintain the walls. Freedom is expensive, and even painful, and many men avoid it. But the choice, for men who would be powerful and free, for white and black alike, is simple: Choose freely now, before your chance has passed, or be forced to choose—hence lose your choice—tomorrow, in a sea of flame.

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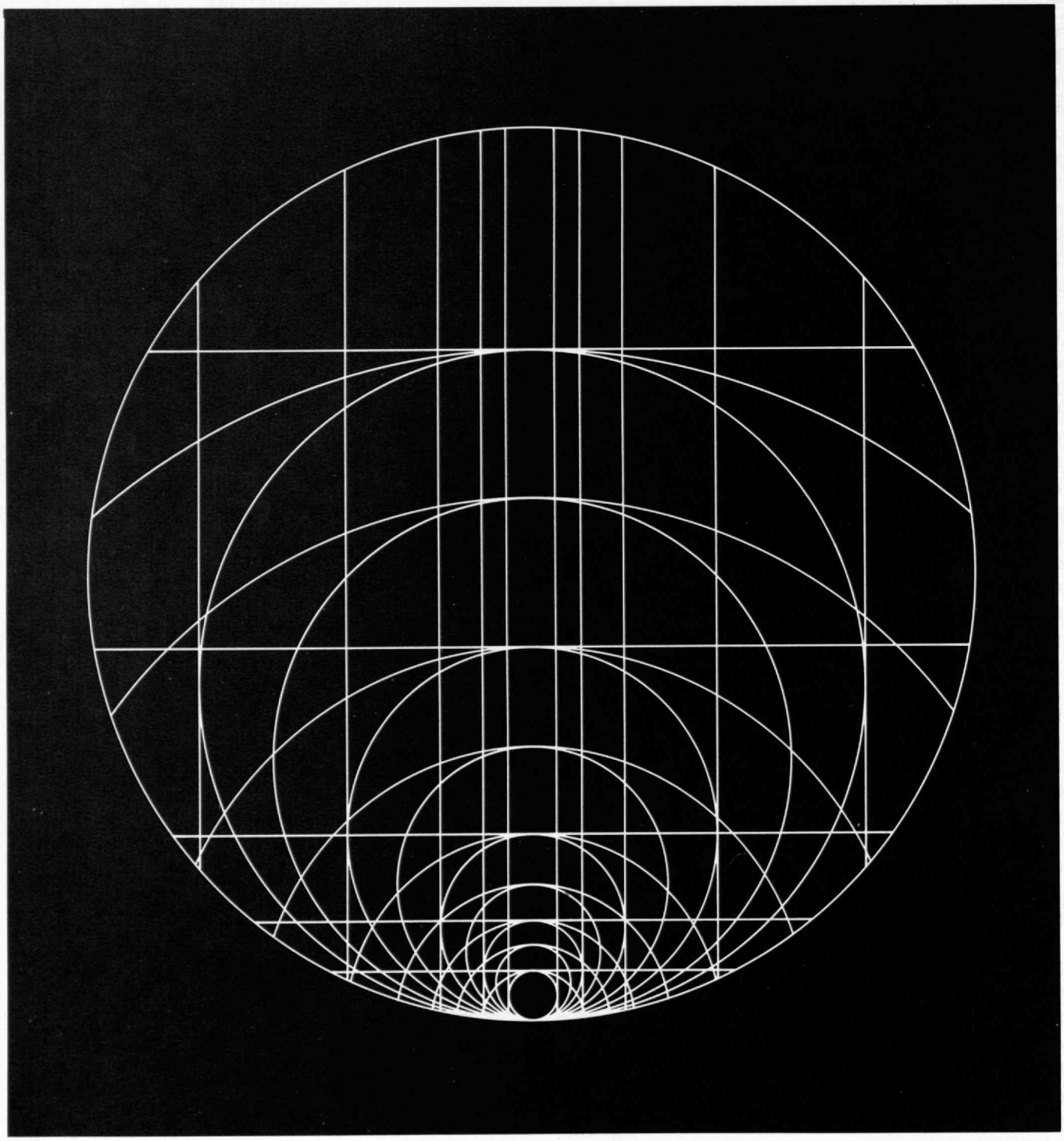


The U.S. is building half the housing it needs; new technology and new attitudes hold the key to making up the deficit

William L. Hooper, '57

Innovation in Housing: Pipe Dreams Or Practical Reality?

Urban housing reflects the best and the worst of our society. Although most strategies advanced for attacking urban ills place primary emphasis on the improvement of education and the provision of jobs, the ghetto inhabitant himself is more likely to put his finger on inadequate housing as the primary source of his discontents. Housing needs are obvious—unmet they provide a continuous irritant which cannot be thrust from the consciousness. In theory, the housing problem can be set aside temporarily and will solve itself as poor families increase their income by learning and using new skills and gaining access to better jobs. But a practical man on the scene in the ghetto knows that this attractive alternative exists only in theory.

We simply cannot afford the luxury of indifference when we need at least 3 million new housing units each year and build less than 1.5 million.

In a recent speech, Senator Edmund Muskie has described the paradox of our urban crisis: "Our technology is capable of producing for us the wide range of opportunities for, and the choices of, living patterns that are the principal virtues of metropolitan life; but our attitudes, our social structures and the political machinery which responds to these attitudes and structures are changing with agonizing slowness."

New technology for housing innovation is now at hand or just around the corner. But achievement of the full economic and social benefits offered by these new technologies of housing will require institutional changes—changes in attitudes, social structures and political machinery which come, as Senator Muskie states, "with agonizing slowness." Our society will soon determine what the logical outcome will be—either frustration and failure or achievement and beneficial change.

In recent years the housing industry has been building between 1.2 and 1.5 million nonfarm housing units per year at an average cost now in excess of $20,000 per unit. Total sales amount to roughly $30 billion. In addition, many billions more are being invested in house repair and rehabilitation, but in spite of this the average age of all housing, new and old, is steadily increasing. Much of this aging housing stock is inadequate; about one out of every four families lives in a house which is deteriorating, dilapidated, or lacks plumbing facilities; 12 per cent of all families are crowded into quarters which are much too small. The needs of a huge underhoused population provide the largest components of basic housing demand. In addition, hundreds of thousands of houses are removed from the housing inventory to make room for commercial buildings, highways, and other public facilities. Finally, population growth exerts its own relentless pressures. In the early sixties less than 1 million additional households were formed each year. But during the next 10 years this figure will rise by 50 or 60 per cent as the step-function in births occurring after World War II finally alters the marriage rate and, consequently, the demand for housing.

From these and other statistics it becomes clear that the potential housing market in the years ahead is not 1.5 million units annually but more nearly 3 million or more.

Improvements in housing cost effectiveness are important to society in several respects. Better housing at less cost has many obvious benefits—including an increase in the likelihood that a poor family would find a habitable, if not luxurious, environment in which to live and bring up children. We can imagine that housing could become a growth industry employing more people, providing workers with a higher annual income, and delivering more goods at a profit.

Unfortunately, wishing—however hard—does not make things happen. Yet in recent months I have become much more enthusiastic about the progress of housing technology. In spite of the roadblocks to the introduction of new housing concepts, several family housing system concepts now exist which offer potential savings in initial cost, main-

tenance, and construction time as well as possible improvements in environmental quality. A few of these concepts have already been carried to the prototype stage, but none has been put into volume production—a critical step for the determination of system costs.

The obstacles to putting these concepts into large-scale production are many and familiar. The entrepreneur is faced with the fact that convenient markets for advanced housing sufficient in magnitude to amortize plant investment and costs of working capital do not exist. Building codes, zoning regulations, local union work rules, building inspection practices and other factors make each city and town a unique market to be custom-fitted—at considerable expense—for housing.

There must be a point at which such constraints become so costly for the society and the rewards of utilizing technological and institutional innovations become so attractive that the edifice of tradition begins to crumble, and we may now be approaching that point; certainly the present situation is unstable. We know that ghetto inhabitants must soon have a reasonable opportunity to obtain adequate housing. But conventional construction technology yields urban housing at $20,000 per unit, and the required tens of billions of dollars in housing subsidies are not likely to be forthcoming.

Prefabrication of Completed Units

One technological approach to new housing involves the factory production of lightweight living units, completely furnished at the factory; the most familiar unit of this type is the mobile home, which, having improved appreciably in size and quality in recent years, has now become our only major form of truly low-cost housing. The typical 55′ x 10′ unit completely furnished sells for roughly $6000, or about $10 per square foot, and over 200,000 mobile home units are now sold annually, in spite of the fact that the homes must be financed as if they were automobiles at interest rates near 12 per cent.

The potential of the mobile home for solving *urban* housing problems is very limited, except for temporary housing in renewal areas. But the possibility exists for using the same production concept to build permanent urban housing. Units could be stacked two or three stories high in rows to form town houses, for example, or factory-produced units could be attached or hung from a structural frame containing vertical access and utilities so as to create high-rise apartment buildings. Some mobile home manufacturers are already producing fixed-site housing as well as schoolroom modules, temporary offices and stores, churches, motels, and dormitories, and a few are investigating the feasibility of stacking modules in various ways. Some manufacturers tentatively suggest that the cost of low-rise town house units manufactured *in volume* exclusive of site preparation but including basic furnishings could be as low as $7 per square foot.

Little has been done to exploit the longer range possibilities of manufactured sectional high-rise buildings. Though optimistic industry representatives have indicated that within five years replaceable modules for living could be manufactured to fit a high-rise steel framework which would provide structural support and utility access, much more engineering design work remains to be done before conclusions can be drawn about technical feasibility and system costs.

A reasonable man might be skeptical about the promise of these concepts, because very few mobile home manufacturers are making significant investments in design, prototype construction and promotion of manufactured town houses and apartment buildings, and indeed no one of the great number of small firms which divide the billion dollar mobile home business has an oversupply of risk capital or "go-it-alone" stamina. But the mobile home manufacturers are not alone in the competition to produce lightweight housing systems.

Other Housing Concepts

The use of porcelain-enamel metal-clad modular

living units has been attempted from time to time. After World War II, Lustron built about 3000 such units which for the most part have maintained their appearance with little upkeep, and metal-clad houses have been built in smaller numbers since then. About 100 single-family units were assembled in 1963 near Allentown, Pa.; about 240 man-hours were required to build each of these 1000-square-foot dwellings, and each house, complete with lot, full basement, and major appliances, sold for under $13,000. An industry representative has estimated that a metal-clad living unit could be manufactured in volume for roughly $1000 per room using production concepts basically drawn from experience with gasoline filling station building.

Several approaches to low-cost housing are conceptually similar but very different in execution. One firm seeks ultra-lightweight in the design of a living unit, a "box" if you will, and is studying the possibility of using a filament winding process originally developed for the construction of rocket cases. Another firm is attempting to minimize material costs and is currently building a prototype apartment building out of large concrete modules, each poured in one piece, and stacked one on top of another.

The favorable reaction of visitors to Habitat '67 in Montreal suggests that further effort should be made to apply advanced concrete technology and structural design to Moshe Safdie's concept of whole new urban environments which bring together housing, shops, commercial functions and public facilities in a way that is economical, efficient and highly livable.

Another approach to housing is the use of site-assembled modular components which are manufactured in volume at a factory. Such units may be designed to permit great flexibility. Using one such system an owner could easily add additional rooms to his building and even build several additional floors incrementally if so desired. A major experimental project using manufactured modular components and housing subsystems is going forward in Detroit under the direction of Neal B. Mitchell, Jr., S.M.'59, a well-known Cambridge architect, who believes that the cost of individual apartments can be reduced to less than $10,000.

These examples illustrate only a portion of the innovative thinking now being applied to housing problems. For example, we know there is much to learn from Europe where a variety of proprietary building systems are actively being used. Some of these utilize factory-assembled steel reinforcing packages which also incorporate integrated plumbing and wiring. Highly sophisticated reusable forms are often utilized to speed the construction work. Other systems use mechanized processes for producing precast concrete panels and prefabricated utility cores, an approach much in evidence in Russia. Carl Koch, who also makes his home in the Boston area, has developed a building system called "Techcrete" which is not unlike some of the European systems. It makes extensive use of large factory-produced concrete panels, structural elements and decking, as well as integrated mechanical and utility subsystems. Potential savings of several dollars per square foot are promised if and when the system is fully engineered and applied on a reasonably large scale.

A supplementary strategy for upgrading the housing stock is that of rehabilitation, which has both virtues and inadequacies that are widely recognized. Efforts to develop a new technology of rehabilitation have been undertaken but cost targets have proven very difficult to meet. It remains to be seen whether rehabilitation on a massive scale can extend the useful lives of structures sufficiently to reduce total lifetime housing costs below that of new construction.

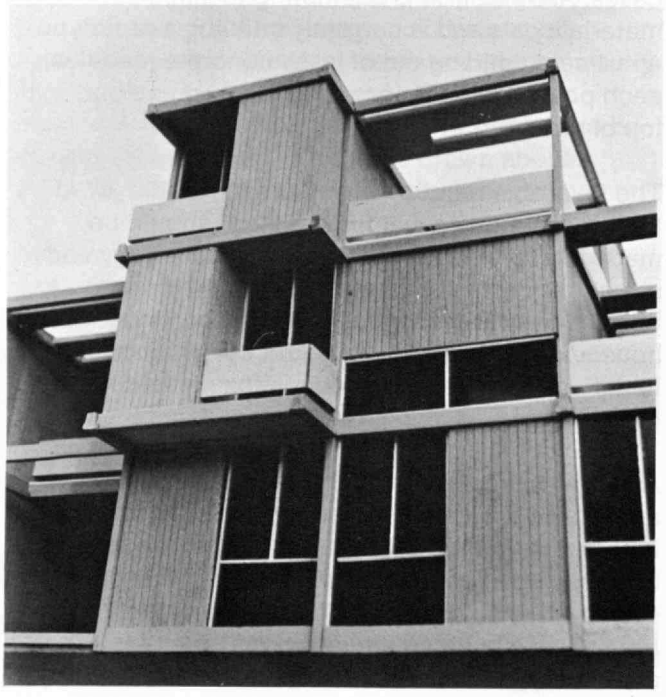
Changing Technology and Attitudes

If the technology of housing production is to change, responsibility for the accomplishment

Two important strategies for reducing the cost of housing are illustrated on this page.

One is based upon factory-built multi-room housing sections trucked to the site for rapid assembly. A 38-unit project of this kind (photo) has been completed in Vicksburg, Miss., by Magnolia Homes, and the firm is now proceeding with much larger projects in several eastern and mid-western centers. Meanwhile, the same basic concept will be used by International Structures in building a high-rise apartment in Richmond, Calif., of lightweight high-strength concrete sections which can be stacked without a structural frame.

The use of mass-produced modular components and sub-assemblies provides a very different environment for housing design, manufacturing, and erection. Neal Mitchell (S.M. '59) Associates of Cambridge are experimenting in Detroit, Mich., with this approach (see lower photo), using a unique post and beam arrangement supplemented by special wall and partition panels, mechanical and electrical subsystems, and other components which can be assembled in an infinite number of ways.



must be primarily with private industry, which provides the bulk of the financing, produces all the construction materials, trains workers, erects structures, and undertakes marketing and promotion. But the environment for change depends heavily on such diverse factors as consumer taste, union attitudes, management commitment, and governmental policies. Local government can be a powerful agent of reaction or change. Property tax laws, codes, building regulations, inspections, land use and zoning policies and metropolitan plans all contribute to the environment of incentives and constraints faced by the potential housing entrepreneur. There is also a less tangible but very real element of community-wide readiness to accept risks in order to achieve unique solutions. Community enthusiasm and adventurousness can mean the difference between thinking about a housing experiment and actually seeing it through.

The federal government does not have an extensive tradition of supporting housing innovation. In years past, it was believed that the private incentives were sufficient and that the government role should be confined to conventional financing operations and special subsidies for certain kinds of housing.

Since the establishment of the Department of Housing and Urban Development a more forceful federal effort has been taking shape, and all the projects I have described are receiving some assistance from the federal government. Recently, the President has requested from Congress funds for the establishment of a comprehensive research and development program in the Department of Housing and Urban Development, as well as new authority to appoint an Assistant Secretary of Housing and Urban Development for Research and Technology.

The federal government plays many roles which could influence the pace of technical change. The

federal government, for example, owns large amounts of real estate, some in or near cities. It builds housing for families of military officers and barracks for enlisted men. It guarantees mortgages. It provides low-interest-rate mortgage funds to nonprofit and limited profit groups for the construction of low-income family housing and housing for the elderly. It finances outright the construction of public housing and makes payments to co-operating communities in lieu of taxes. It finances and, to some extent influences, metropolitan planning. It supports planning for model cities and will soon begin selecting projects to receive grants. It administers a rent supplement program. It taxes the profits of property owners, builders, and manufacturers.

All of these functions are now being examined to see how they affect the environment for housing innovation. One attractive possibility is the application of new procurement concepts to military or public housing. Another strategy under consideration involves the use of federally owned property for housing complexes. Certain federal funds for the financing of housing could be allocated specifically for the purchase of advanced housing systems in order to provide temporary protection to this "infant industry." Seemingly small changes in tax policy or regulations could have an enormous impact on the construction and housing scene.

Many other federal actions are possible, ranging from the support of a major housing systems development program to the undertaking of a series of studies to identify the likely impacts of an industrialized technology for low-cost housing on industry and labor. Although industry must provide leadership and the bulk of the financing for a large-scale program to provide millions of low-cost housing units, some assistance from the federal government will be necessary and undoubtedly will be provided.

The innovative process out of which must come new concepts of housing system manufacture may not thrive in the barren ground of the housing industry. The long-term commitment of large corporations which is essential to the creation of a new housing industry may not be forthcoming; firms which could bring to bear an intimate knowledge of the housing market may decide that today's profits are adequate and that new concepts, risky and unproven, should be ignored or attacked. Labor unions may continue to be apprehensive of arrangements which would increase labor productivity while blurring the distinction between craft and factory worker. Local officials may continue to require lead bends, 2-by-4's 16 inches on center, and inspection at the housing site instead of the factory. And the federal government might lose the nerve and commitment it has only recently begun to display. But time is running out and my own study of the situation has made me change my own position from an enthusiastic skepticism to skeptical enthusiasm.

William L. Hooper studied civil engineering at M.I.T. with the Class of 1957 and then continued his academic work in the Sloan School of Management for the S.M. degree (1960). He served with the M.I.T. Fellows in Africa program as Assistant to the Regional Controller (West Africa) of the Colonial Development Corporation, Lagos, Nigeria, and Acting Assistant Secretary to the Government of Western Nigeria before joining the staff of the Office of Science and Technology in the Executive Office of the President in 1963. As Technical Assistant to the Presidential Science Adviser, Mr. Hooper's primary interests include innovation in the private sector and the application of science to urban problems.

By design and by default, our present urban programs serve to shield poverty from affluence and deprivation from opportunity

Bernard J. Frieden, Ph.D.'62

The Governmental Maze: National Goals and Local Barriers

Much of the effort now being made to improve the conditions of urban life in the United States is thwarted by walls of governmental structure. The complexity of this structure is not a problem in itself, but there are serious inconsistencies between our arrangements for governing urban areas and several of our national goals.

The 18,000 Governments—Current Trends

Research into the nature of metropolitan areas over the last 15 years has shown a dominant element of urban life to be interdependence: we have metropolitan-wide labor markets, job markets, and housing markets. The actions of any one community can significantly affect neighboring communities and the entire area. But the governments of our urban areas remain divided into many small local units—some 18,000 units in the 200 metropolitan areas nationally, and in the New York metropolitan region alone a number indicated by the title of Robert Wood's well-known study: *1400 Governments.*

Not only is there a proliferation of small governments in urban areas; the predominant approach of the country to solving urban problems stresses local, small-scale action. Current proposals for dealing with slum problems by and large reflect the view that the solution to these problems lies within the slums themselves rather than outside. Community action, small-scale job training, and improvements in local services are recommended for elimination of poverty. Big-city mayors often claim that the cities can solve their problems by themselves, that all they need from the states and the federal government is money and the freedom to spend it as they wish.

Going It Alone—Limitations of Local Action

Neither experience nor analysis of the problems supports such an independent approach. There are too many limitations to what can be done within a local framework. Neighborhood programs such as Mobilization for Youth in New York can make many improvements, but these programs fail to come to grips with the inadequacies of city- and metropolitan-wide institutions whose operations directly affect the people they are trying to help. No matter how sensitive a screening process is set up in a local neighborhood to refer people to the right social services, for example, if the social service system itself is inadequate, the program has a limited effect.

There are just as many limitations on city-wide action. First, there is often a lack of resources—a limitation which central city mayors themselves point to in seeking federal aid. In spite of efforts to uncover new tax revenue and in spite of growing intergovernmental grants, the mainstay of local finance is still the local property tax. Thus the income of a community's residents, which is reflected in property values, has much to do with the strength of its tax base. Communities where the poor are concentrated have enormous needs for public services—for education, welfare, health, and police and fire protection—but a wide gap between their needs and their tax resources.

This disparity between needs and resources prompts local governments to compete for tax resources, to attract people who pay high taxes and require only limited services. Central cities try to strengthen their tax base by rebuilding for middle- and upper-income residents; the suburbs try to protect their tax base by keeping out the poor. Fear of driving out middle-class residents often prevents local governments from taking action in providing low-cost housing or enforcing open occupancy laws. Thus, a second limitation on the effectiveness of local action is competition for tax resources.

A third limitation on local action is the inability of local governments to make effective use of the metropolitan housing and job markets and to integrate schools on the basis of metropolitan population. Despite central city claims that all they need is money, central cities simply cannot provide jobs for their population. Most central cities are barely holding their own in terms of the number of jobs

they add to the economy; they tend to lose industrial jobs, gain white-collar jobs, and on balance stay about the same. A study of New York City by the Bureau of Labor Statistics found that between 1958 and 1963 there were essentially no new jobs added by private industry; the sole growth of jobs in New York resulted from increases in government activities such as education.

In practice, the cities have been turning more and more to the states and the federal government for help, contradicting their own rhetoric on what can be achieved through independent action.

State and Federal Roles

State and federal responses have been limited and uneven. All states provide some local school aid, covering 37 per cent of local education costs nationally but with wide differences between states. Only five states contribute to urban renewal costs. Only 14 offer aid for subsidized housing.

At the federal level there has recently been a strong response to city requests for aid, at least in generating new programs. There are now about 120 grant-in-aid programs from the federal government to the states and cities, providing over $15 billion per year; of these, about 70 directly support urban development. Despite this large number of programs for federal aid to cities, however, the amount of money available is still relatively small. As of 1962, direct federal grants to cities constituted only 2 per cent of local government expenditures nationally.

The states have great reserves of legal authority with which they could singlehandedly solve a great many of the problems that are plaguing metropolitan areas, especially by reducing governmental barriers to action. States could, for instance, merge local governments, reshape their powers and functions, create metropolitan-wide school authorities, and intervene in many ways to redirect local policy. The federal government lacks the authority to intervene in these ways; instead, its approach is to use financial incentives to influence the nature of local programs. The states have the legal power and the federal government the money to bring about change. Neither level of government has yet deployed its resources very effectively.

One reason for the unevenness of the response of the federal and state governments has been confusion as to exactly which problems are to be solved through intergovernmental action. Until recently, most federal and state attention has been given to service problems (especially suburban service problems)—transportation, water supply, waste disposal, pollution, the duplication of facilities, the high cost of suburban development, standards of this development, urban sprawl. The need for metropolitan-wide action is increasingly appreciated in the handling of these problems. That transportation and utility systems should be planned on a metropolitan-wide basis seems obvious: road segments in different communities must match up to form a system; metropolitan water supply systems are the most economical and efficient; metropolitan waste disposal systems are necessary if only to prohibit one community from sending its waste downstream to its neighbors.

Considerable progress has been made in dealing with service problems through state and federal participation. In the federally aided highway program, states do the basic highway planning to ensure consistency between communities. Several states have taken action on the water supply issue, and the federal government and states are acting together to control water pollution. The recent report of the Advisory Commission on Intergovernmental Relations, *Metropolitan America: Challenge to Federalism,* details at great length the kinds of adjustments and adaptations of government that have been made to provide more efficient services.

Federal planning regulations still accept fragmented control of a service system within a metropolitan area, but they require that plans be drawn up on an area-wide basis. Federal aid to local communities under urban development programs increasingly requires reasonable consistency between locally aided projects and metropolitan-wide plans.

The Field for Action

In my opinion, however, our highest priority problems are not service problems but social problems, especially those linked to unequal opportunities in such vital fields as education, housing, jobs, and health care. There are great disparities in opportunity for different groups of people within the cities and between residents of the suburbs and those of the cities. James B. Conant, in his prophetic book, *Slums and Suburbs,* noted that many slum schools spend less than $500 per year for each school child, while many good suburban schools spend over $1000. Although most of the U.S. population has enjoyed unprecedented economic progress since World War II, the number of urban Negro families living in slum housing increased in the 1950's, while the number of white families living in slums was sharply reduced. Even as late as 1960, the year of the last national housing surveys, almost half of urban Negro families—46 per cent—were still living in slum housing.

The role of our present metropolitan arrangements in fostering such inequalities is illustrated by the

job-access problem. We have built our urban areas in such a way that the Negro tends to be highly concentrated in the central city, cut off from the suburban industrial developments where large numbers of blue-collar jobs are becoming available. Professor John Kain of Harvard, studying relationships between residential patterns and work patterns of Negroes in Chicago and Detroit, found that Negroes are systematically underrepresented in employment as jobs are located farther from their homes. This situation apparently results from a combination of transportation and information problems. Negroes have difficulties traveling to jobs in the suburbs. Additional obstacles result from the way in which blue-collar workers tend to find jobs—not through classified ads or employment agencies, but by hearing about them from friends or family, a method which works very poorly for people who live miles away from suburban job centers and are not in touch with suburban workers. Kain estimates that racial segregation of this type may be costing Negroes 35,000 jobs in Chicago and 9,000 jobs in Detroit.

It is towards the elimination of precisely such inequalities—in employment, education, and housing—that we as a nation profess to strive. Legislation of the past five years on civil rights, the war on poverty, housing and urban development, and health services sets forth eloquently the goal of equality of opportunity. Yet this national goal is constantly blocked by a governmental structure that makes most of our national urban policy subject to local tax pressures and local policy.

Strategies for Urban Policy

What can be done to overcome these barriers? Two major alternatives for public policy can be characterized as moving dollars and moving people. The former is the dominant approach today. It is an approach which implies an acceptance of segregation, saying, in effect, to the Negro: "Stay where you are; we'll send money." There has been some redistribution of money through federal and state aid: taxes from wealthier communities filter through the state capitol or through Washington and back through urban programs to the poorer communities. The Advisory Commission on Intergovernmental Relations subscribes strongly to this policy of dollar-moving, and much recent federal legislation reflects this approach.

Moving money doubtless helps. But moving dollars has only a limited effect in giving the poor access to good schools, housing, jobs, and services. The need for more than money is particularly apparent in housing. Following the dominant trend of directing money into particular areas, most of the federal low-income housing legislation is intended specifically for central cities. The moderate-income program has been made difficult to use in the suburbs by regulations stipulating local control over whether such housing can be built in a community. The Model Cities Program now allows communities to work together but provides no incentives for them to do so; the original plan for local programs to counter segregation by race or income was deleted by the Congress.

The shortcomings of housing programs directed at individual cities are becoming clear to people who administer these programs. A survey of central city relocation agencies by the Advisory Commission on Intergovernmental Relations had as one of its objects to discover the obstacles to relocating displaced families in decent housing at prices they can afford. The agencies were asked what actions, if any, by other local governments in their areas would contribute to more effective relocation of people displaced by urban renewal, highways, and other public action. The answers were notably consistent. From Buffalo: "(We need) more low-income housing in suburbs." From Cleveland: "If they (neighboring municipalities) would adopt a fair housing ordinance in their communities. . . ." From San Francisco: "Over-all consideration of housing problems in the Bay Area . . ." From Washington, D.C.: "The suburban areas, because of present real estate practices, or because of the economics of the metropolitan market, are pretty much closed to displaced families from the District of Columbia. . . . (We need) a fair-housing ordinance (in the suburbs), such as that now in effect in the District of Columbia."

In spite of increasing recognition of the problem, we still lack programs that will make it possible for substantial numbers of low-income and minority families to move from the central city to the suburbs.

Improving Metropolitan Opportunities

The obstacles to more effective action on urban problems are deeply rooted in present governmental and private arrangements. There are no simple solutions, but many related steps could be taken to help realize our national goals.

Tax competition between local governments could be eased by a more effective tax redistribution system. Our present tax system rewards communities that exclude the poor. To encourage communities to admit a broader cross section of income groups, state and federal aids should free local governments from primary dependence on their own tax base. To reverse present incentives and to provide a more adequate base for public services, state and federal aid should take account of differences in local fiscal capacity, with larger grants authorized for communities where the poor are concentrated.

Closer judicial review of suburban zoning and building controls would be desirable. The courts have generally been rather lenient in upholding zoning and development controls that have the effect of raising the cost of new housing in a community, sometimes deliberately. Many communities require expensive construction and large minimum lot sizes that go far beyond reasonable standards of safety or health. Such practices should be challenged on the basis of metropolitan-wide needs for moderate-cost housing and the improper use of development laws to exclude unwanted residents.

Improved fair housing laws and better enforcement of them would help end direct racial discrimination that prevents Negroes from buying or renting suburban housing that they can afford. Twenty-one states now have such laws, but there are significant gaps in their coverage. Further, most state enforcement procedures rely mainly on individual complaints as a basis for action and fail to make a systematic attack on patterns of discrimination practiced by developers, real estate brokers, and lending institutions. A systematic attack on discrimination in housing would include frequent testing of real estate practices and a choice of strategic cases to pursue in order to open up housing in a price range that substantial numbers of Negroes can afford. The present case-by-case enforcement of fair housing laws in response to individual complaints leads to token results rather than a genuine increase in housing opportunities.

New programs to provide low-income housing could be designed specifically for use in the suburbs. Federal aids for low- and moderate-cost housing now are designed primarily for use in the central cities. Programs for the suburbs might include additional grants to offset the cost of local public services for new low-income residents, particularly the cost of building new schools. Congress has provided for a form of local government veto over the use of present low-income housing programs, including public housing, rent supplements, and moderate-income developments. The latter two programs might well be reshaped to encourage private groups—nonprofit sponsors or fair housing organizations—to apply to F.H.A. directly for aid, as other developers do in the case of other F.H.A.-administered programs which do not require local government approval. Alternatively, rent supplements might be given directly to families to use wherever they wish rather than only in specified new developments.

The U.S. Conference of Mayors last year called for a still stronger dose of federal policy to open up the suburbs. The mayors recommended that the federal government require local communities to provide a reasonable share of the low-and middle-income housing in their metropolitan area as a condition of receiving aid for water and sewer systems, open space, and other community facilities.

Another possibility is to require provision for a substantial amount of low-income housing in federally aided new communities developed on open land. Existing legislation for federal aid to developers of new communities, even when fully implemented, will not stress low-income housing. Nor will the new communities now being planned or built privately around the country. Some of these will provide token amounts of subsidized housing, but basically they are attempts to build better suburbs for middle- and upper-income groups.

Future Urban Growth

In building the future urban America, we must consider more than the problems of space and capital investment that will be needed for doubling our urban plant by the year 2000. We must decide how we are going to build—so as to provide fresh opportunities for segregation, for the more affluent to withdraw even further from the poor and the central cities; or so as to provide a more equitable distribution of opportunities. Present trends are following the former course. Negro population growth is more concentrated today in the central cities than it was in the 1950's: since 1960, 87 per cent of Negro population growth under the age of 14 has been in the central city. If present birth rates and patterns of mobility continue, many big cities in addition to Washington will have Negro majorities well before 1980: Baltimore, Cleveland, Detroit, New Orleans, Philadelphia, St. Louis.

The grim prospect for the future is not that central cities will be predominantly Negro; it is rather the prospect of an armed confrontation between fearful suburbs fortifying themselves against central cities, while the central cities are steadily filling up with angry Negroes. Even such programs for metropolitan co-operation as exist today face destruction in such an atmosphere. Unless we take corrective action, the prospect is for continuing segregation and continuing crisis in race, poverty, and inequality, even while we polish and perfect the tools for better suburban development.

The issue is not whether to give charity but whether to provide opportunity.

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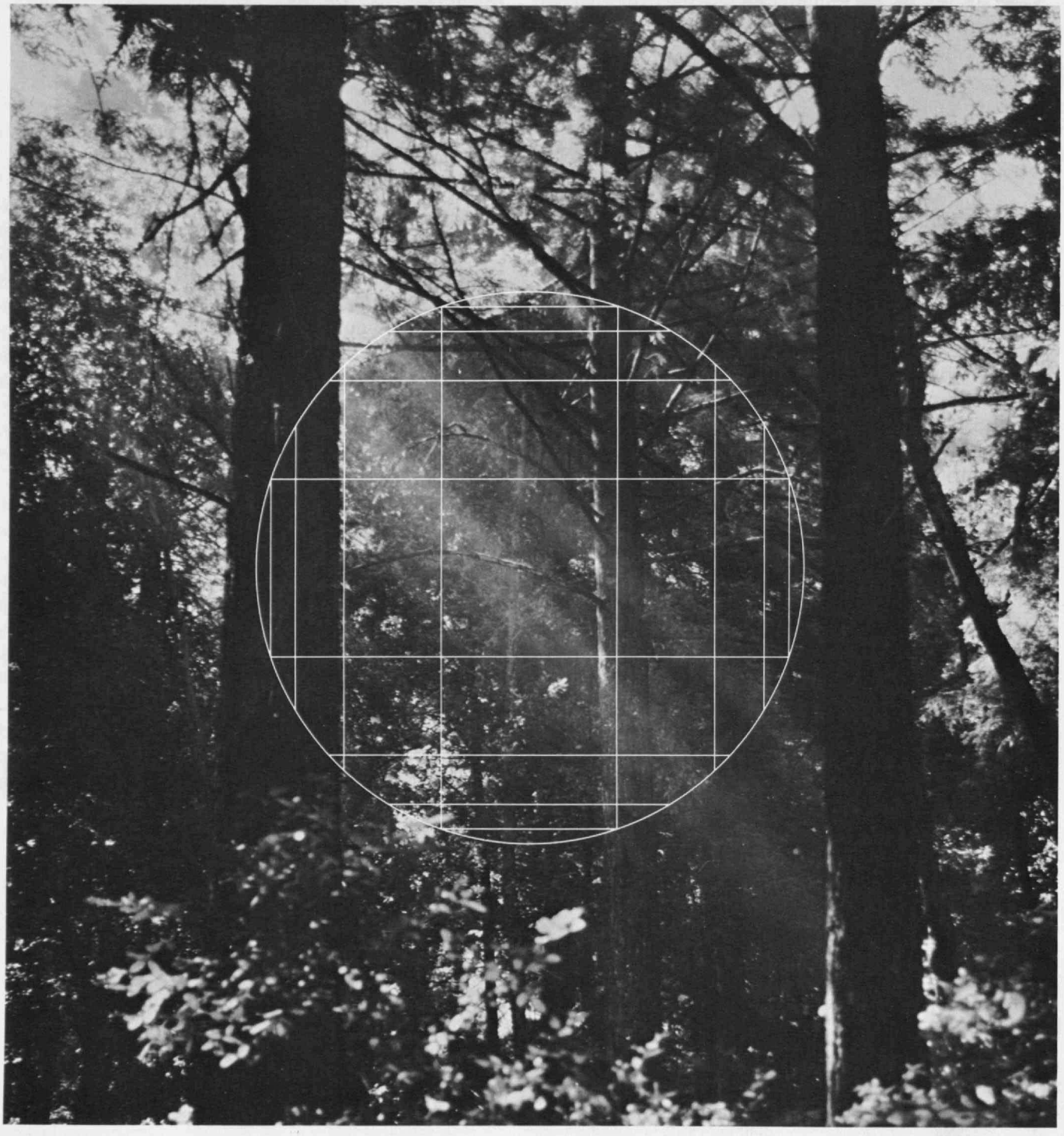
Herblock in The Washington Post

"Those Alabama stories are sickening. Why can't they be like us and find some nice, refined way to keep the Negroes out?"

Herblock in The Washington Post

"These weren't damaged in the riots—they went to pieces years before."

Drawing by O'Brian. © 1956. The New Yorker Magazine, Inc.



How can the city of the future—50,000 square miles and 600 miles long—provide qualities of life, diversity, mobility, and openness which will make it a "human" environment?

Kevin A. Lynch, '47

The Possible City

The issue for the future city is how it affects the growing of human beings. (If we knew better, we might add: and the survival and development of other living organisms. But our knowledge and our ethics are still too limited for that.) Some environments favor growth, some do not. The pattern of activities and spaces plays a role in the growing. There are various world futures which we can imagine: Do any of them include a city suited for growth? Can we make that possible city a probable one?

We hope to make environments which accept change, and also to manage that change so that it occurs in the areas of need and does not degrade the living community. Environment might be used to decrease deprivation and segregation, rather than to sharpen it. It might create more intricate ecologies. Indeed, we might learn not simply to accept change but to see its possibilities and delights.

Our fear of change is accompanied by a fear of powerlessness, the loss of meaningful participation and control. The individual makes only marginal alterations in the system in which he lives. Perhaps there were never more than rare periods in history when the individual had any autonomy, but we feel that he should have, and does not now. Fears of impersonal control are evoked by recent advances in biology, in psychology, in information systems. People are aware of the extent to which their lives are already manipulated. Alienation and loss of purpose are talked about; they also exist. The increase of leisure and material production threatens to exaggerate those feelings by detaching men from the work that has been their central purposeful activity.

Environment can counteract this loss. Surroundings can be designed to be open and responsive to the user; they can encourage him to learn and to become involved; they can be a vehicle for autonomy and local decision, an object of creation and purposeful absorption. Technology might increase individual option and control, rather than decrease it. None of this will of itself solve these dilemmas, and yet it can countervail.

Our possible city must therefore have certain characteristics: adaptability coupled with a sense of past and future continuity; equalization of opportunity; a diversity of species, habitats, and ways of life. It must be open and responsive, experimental and engaging. These are crucial qualities for the future. However general, they direct attention to particular possibilities. But these possibilities will not come of themselves. Our cities become more rigid, segregated, and unresponsive. Are there chances to move in an opposite direction?

The Edge of Metropolis

We can expect metropolis to be the normal environment of the future: the realized desire of those seeking space, better services, congenial neighbors, and a home of their own. Present estimates are that 80 per cent of our population will be living in such regions by the year 2000 and that the largest of these metropoli will coalesce into four giant megalopolitan regions—on the Atlantic seaboard, along the lower Great Lakes, in Florida, and in California—four regions containing 60 per cent of the U.S. population on 7½ per cent of its land. The horror of critics is unjustified: this is a superior environment by past standards. It doesn't "eat up" land, nor will it cause the end of civilization. It frees large areas of the country for rural and recreational uses. The apparent threat of extended urbanization can in fact be turned to our great advantage—can be but may not be. Metropolis has serious problems. Social groups are increasingly segregated in space. There is a lack of diversity and a lack of identity. If you have no car, you are stranded. There are no concentrated centers. But none of these difficulties is inherent in the metropolitan form.

If you ask anyone to imagine a city of 50,000 square miles, 600 miles long (as the Californian megalopolis is projected to be), he feels desperate because he imagines a mechanical enlargement of

the present city. But one need not feel lost in a region, simply because it is encompassing. Setting limits is only one way of structuring. Such a region could be a very diverse place, it could be clean and open, the quality of its life could be pleasant and challenging. It could be a homeland, a beloved landscape. The sense of being at home depends neither on size nor on traditional form but on an active relation between men and their landscape, a landscape which they made and which speaks to them. How can we achieve this in such vast areas?

The most effective opportunities for environmental quality are at the point of development. One such opportunity is at the edge of the metropolis where public (or mixed public and private) authorities might assemble and plan large chunks of undeveloped land for diverse urban uses, which would then be transferred to private and public development agencies for actual construction. These would not be "new towns" in the old sense. The authorities would work with the normal urbanizing process, much as several large private land developers are doing today, but on a far more comprehensive scale. The private developer works under severe limitations of market and political control, yet his product is the environment of the future.

Here at the growing edge our evolving ideas for clusters of mixed low-density housing, for the maintenance of ecological balance, for intense diversified centers or continuous open spaces, for new modes of transport or the control of climate, light and sound could most easily be put into practice. The region would become a mosaic of distinctive and well-fitted districts, a human landscape built from the beginning. No one is building it today.

All large developing areas at the metropolitan fringe should pass through the hands of capable public authorities but not through a single central authority. It should be a public responsibility to see that an adequate supply of land for development is constantly available throughout the metropolitan region and that it is well planned, well serviced, and free of speculative surcharge.

This public power must only be used if it will reduce the growing segregation of our population by race and class. Rather than straining to entice the middle class to return to the central city they have left behind, we should make it possible for others to move out to the suburbs that they would like to reach. This will be a long effort, contending with resistance from the suburbs and fear on the part of the movers. It will require concerted action on jobs, housing, and transport—a massive resettlement. Grants to local authorities to pay for the additional services required must accompany these movements, to make them politically palatable. "Sister" relations between inner and outer districts, with exchanges of services and visitors, might precede permanent population movements. Ghetto populations might organize and develop their own new suburban communities. It may be unrealistic (even undesirable) to hope for a fine grain mix of social groups, but we must destroy the one-color school district and the single-class town.

In these new fringe areas, we can channel high-density housing, services, and concentrated employment into a galaxy of metropolitan centers, each large enough to provide substantial diversity and to support a local transit system, provided with structures linked at many levels, pedestrian carriers, and climate control. To the extent that these centers have a special character of activity and form, they can stand for differentiated areas of the region and might encourage social interactions over a broader geographic base, less tied to class and race.

In and near these centers might live people who, by choice or necessity, wished to be close to work and services. The range of activity and the physical character of these centers could be guided in a way which would be impractical over larger areas. Building or rebuilding their important focal points is another crucial development task which might be undertaken by public authority. There are significant advances to be made in the design and maintenance of such intensive locales.

We are already building the future metropolis. If we refuse to intervene decisively, that future is an even suburbia and a decayed interior. It will have its amenities. It will also have severe costs—not least being a denial of growth to a sizable number of people. And it will be a splendid opportunity gone by.

Change and Renovation

Activities that occupy the older areas are constantly changing, and we have burned our fingers in trying to manage that change. In the slums and ghettos of the center, the growth-denying perversities of our society have become most sharply evident. But even the oldest areas are not completely abandoned; they become specialized for activities which are often more diverse than the original ones. We should facilitate these shifts in use, not frustrate them, while increasing the ability of local neighborhoods to direct their own futures. Either to cling to the present, or to impose "rational" solutions from above, are the twin dangers. We can encourage the central areas to open out, to become the locus for particular uses, people, and institutions, even to be attractive vacation areas in which open space and intense

urban activity are closely mingled. Some concentrations of high-density housing wlil persist, particularly at the core, but we can expect to see apartment living widely distributed throughout the metropolitan region. Areas of particular historic interest or environmental character should of course be conserved, but they occupy a small fraction of the land. The central ghettos must be transformed, not only into centers of political power and social reconstruction but also into settings of prestige, the symbolic centers of cultures newly visible in our society. As a prerequisite for unlocking this process of change, its costs must be openly accounted for and justly allocated. The burden now falls on deprived and powerless people.

One promising avenue for dealing with the existing city is the search for underused space and time and its readaptation for a desired activity. We can explore the use of streets as play areas and the possibilities of using roof tops, empty stores, abandoned buildings, waste lots, odd bits of land, or the large areas presently sterilized by such mono-cultures as parking lots, expressways, railroad yards, and airports. We may find room for new modes of transit, additional housing, schools, or special recreation.

Another strategy is to find ingenious ways of adapting or reconditioning the existing environment with a minimum of disturbance to existing users. Rehabilitation techniques have not yet proved very promising, except where the improvement has been done by the user-owner, making it fit to his own particular desires. New techniques which aided this latter process—packaged amenities which are easy to insert; tools, power, and materials for use by the individual; training and guidance in rebuilding—would all be useful. Technical services and information must be made available directly to the user of environment, particularly to those who presently have no voice in political and developmental decisions.

Perhaps we can organize a rebuilding and maintenance industry and begin to conserve our still useful environmental stock in a more systematic and efficient way. Renewal and rehabilitation has traditionally focused its attention on the oldest parts of the central city. Our present task is to find ways of putting this renewal into local hands. The problem for the future is the conservation and improvement of what are now the suburbs. Surely there are ways in which sophisticated technology could be employed in such essential tasks as the cleaning or refacing of outdoor surfaces, the modification of noise and climate, routine housekeeping, the prevention of fire, the removal of waste, the provision of local communal services or the insertion of small gardens or micro-recreation facilities. It is just this kind of environmental renewal that can provide jobs for many of the lowest skilled or racially excluded workers. Maintenance technology should be designed to make use of such men, and then to train them in more complex skills.

We will always be concerned with the problem of obsolescence. Technology and styles of life will shift in the near future at least as rapidly as they have done in the near past. One reasonable response is to make sure that any new environment is highly adaptable, able to accommodate new functions at low economic or social cost. We know very little about how to do this; we can only make vague guesses: building at low density, providing growth room or surplus capacity, providing a high capability for circulation and communication, separating functions and structures that are likely to change from those likely to be permanent, using temporary or movable structures (only if we are later able to control their disposal, however), establishing a neutral grid to regulate locations and connections, setting up a monitoring system which will call for adaptation at the first signals of change. We have much to do to develop and test these ideas. The urgency and permanence of the problem would make full-scale research worthwhile. For example, we would like to be able to specify levels of adaptability as performance standards for new construction.

Change adds novelty and adventure to living but exacts an emotional price. Environmental form must take account of these stresses: providing clear orientation for the newcomer, with some familiar stereotypes, clarifying the image at larger and larger scales, so that the individual may feel that he is only moving about within his permanent "home," providing symbolic landmarks of continuity with the past, making change legible in itself. Behavior changes rapidly; physical form may be used symbolically to stabilize it and give it continuity, as well as to support it functionally. By expressing what shifts are going on, how they arose out of the recent past and are likely to continue into the near future, the environment can help us to live with change and even to enjoy it. It will also be necessary to establish and protect areas of little change, of archaic ways of life, for those who do not choose to follow the common pattern. Tenure of a second home in a stable setting may make change elsewhere more acceptable. In a shifting world, one must know how to forget and how to remember, how to conserve and how to dispose of environment. The problems of change and mobility will be fundamental ones for the future city.

Design for Mobility

Mobility, access and communication are indeed the essential qualities of an urbanized region—its

reason for being. Cities can be most simply described as being dense networks of communication, and the movement of persons is the critical process. Thus the system of movement is strategic for the quality of the future environment.

One of the most efficient ways of enhancing the adaptability of an environment (and of improving the chances and choices of its citizens) is to increase the accessibility within it, so that activities can easily shift from one location to another, or as easily shift their linkages. Fast transport is not enough; people must also feel free to enter, and the location of activities and the system of access must be perceptually legible. To increase the level of accessibility will be to continue an historic trend which is freeing more and more persons from the tight bonds of place and increasing their scope for action. The future difficulty will not be how to prevent traffic jams but how to prevent relative disadvantage from increasing—children locked into suburbs, low-paid workers tied to scarce jobs, old people shut in golden-age corrals. Public policy should increase the access for all groups to a wider and wider area. We should have a free transit system, operating over extensive regions. But rather than dream about a return to "efficient" mass transit, we should build a system of small-unit, flexible transport which caters to all groups: safe vehicles in which children can roam or that are suitable for the infirm, programmed mini-buses that will work in low-density areas, special carriers for high-density centers, recreational vehicles, or those that challenge the user by requiring skilled control. The automobile need not be abolished, but modified and regulated to prevent pollution, increase safety, or decrease noise, congestion, and the pre-emption of valuable space. The routes themselves can be diversified: direct lines for people in a hurry, slow leisurely tours for pleasure, challenging routes to test your skill, safe easy ways for children or the elderly: motor ways, bus tracks, bicycle paths, horse trails, moving belts, waterways, footpaths. Innovation in vehicle and channel design should be a public function.

We can expect the mobility of population to increase both in frequency and in range. People will be on the move not only for better jobs, but also for better climate and environment. Distant vacations, pilgrimages, temporary and seasonal communities will be commonplace. Environmental quality will become more important for the economic survival of a place, and places will be liable to receive sudden shifts in load. The Easter mobs on the beaches of Ft. Lauderdale, or the influx to the Sunset Strip in Los Angeles, are a future sign. Adaptability and the rapid organization of environment will be crucial. We must be able to shift services, personnel, and equipment, even to employ mobile settlements. These pose new problems of design, which should now be under study. As a simple example, we are presently unable to deal with the design of the trailer park, even though it is by now a common residential environment.

Traveling is traditionally considered an unfortunate necessity, a "waste of time" to be minimized. Yet recreational travel is widespread, and ordinary routes could easily be designed to make traveling a delight, and not just a necessity. The sequence of open spaces, motions, visible activities, lights, planting, textures, views, all can be managed to the pleasure of the moving observer. Views can pick out the principal elements of a city region, its most interesting activities, its history, geology, and fauna. Highways might move through giant sculptures. At little additional cost, metropolis may be endowed with a network of scenic corridors. Air travel is a more resistant problem, since present technology is directed toward anesthetizing the experience. But there may be ways to exploit the act of flight.

Our roads are monomanias, used for a single purpose, and driven heedlessly through the landscape. We could use rights-of-way for many other purposes than circulation—for housing, for example, or for recreation or commerce. Roads can be designed to enhance their flanking areas and to make space for local facilities. They could be an integral part of the landscape, rather than a scar. Roads are the observation platforms of a city; they are the prime means by which people organize large regions, making them psychologically as well as physically accessible. The design and development of the entire movement system, including its vehicles, its associated facilities, and its multi-purpose rights-of-way, is one of the great environmental opportunities: it touches on vital interests; its construction is a customary public function; it is an object of great interest for many citizens; it reflects and makes possible a new way of life; it offers unexpected possibilities of form.

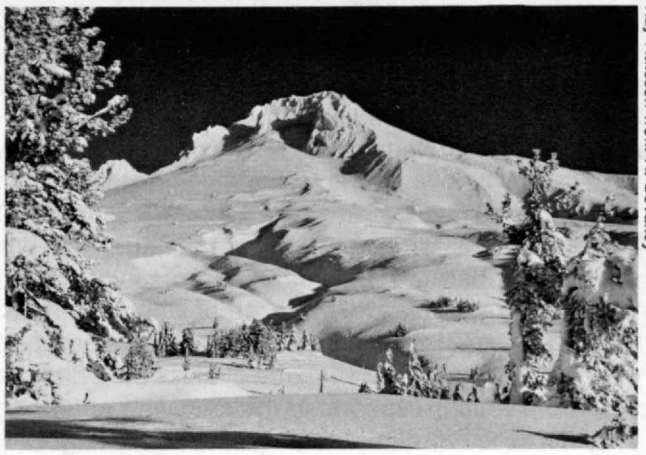
An Open Environment

It is crucial for our purpose that the future environment be an "open" one—which the individual can easily penetrate and in which he can act and learn by his own choice. Development of the individual has been an historic role of the city, but it has never been articulated as a conscious goal of environmental policy. The growth of leisure, the economic demands for high skill, the danger of leaving a section of our population behind in helpless ignorance combine to make this humane ideal an urgent social requirement. An education is gained in many ways, not least through the city itself.

The provision of a new kind of open space, open to the freely chosen and spontaneous activities of

city people, would be one strategic and tolerable way of building an educative city. I do not mean tennis courts or baseball diamonds, which, however desirable, are designed for standardized activities; I mean the uncommitted complement to the system of committed uses which make up an urban region—the ambiguous places of ill-defined ownership and function. There are many possible kinds: pits, mazes, raceways, heaths, woods, thickets, canyons, beaches, allotments and do-it-yourself cabins, roof tops, hobby yards, caves, marshes, canals, dirt piles, junk yards, aerial runways, undersea gardens, ruined buildings. The zones between contrasting regions are of particular value, because of their ambiguity, flux and range of choice: shore lines, quiet gardens in city centers, the edge of woods, the meeting of salt and fresh water. My kind of open space may even be within doors—in barn-like buildings where people are allowed to organize various activities at temporary stands. Space of this kind extends the individual's range of choice, and allows him to pursue his purposes directly, and gives him a chance to demonstrate mastery and to participate actively in a way usually denied in the protected and expensive, committed environment. Here he can act at his own pace and in his own style. Open space is a place of stimulus release, withdrawal and privacy, in contrast to the intense and meaning-loaded communications which confront him elsewhere. In a preferred environment, one can deny communications, as well as seek them—protest, even rebel. The guerrillas of the future will need a base of operation. I am not speaking simply of places for "fun," but of places where people may develop commitments and run risks of their own choosing, where they may invent their work and their play, learn to care about things and people, and to exert the effort that care demands.

For all these reasons, the acquisition and development of a set of uncommitted spaces throughout the urbanized region is a strategic action. But in the city we wish to make possible we can go farther. We can think of the entire environment as a means to education, a place where learning and working are indistinguishable and absorbing activities. Such an environment would be highly diverse, offering rich sources of information and experience in the midst of everyday life: working processes and styles of life exposed, human and natural history explained, unusual trips and experimental actions facilitated. This would be a manipulable world, inviting action and responding to it, thereto; a domain where people could see the results of what they do; a social world with open niches; an array of teaching machines, through which people might gain and structure skill and information at their own pace and for their own purposes. Surely this redefinition of working and learning will not be brought about by changes in city form, but form can



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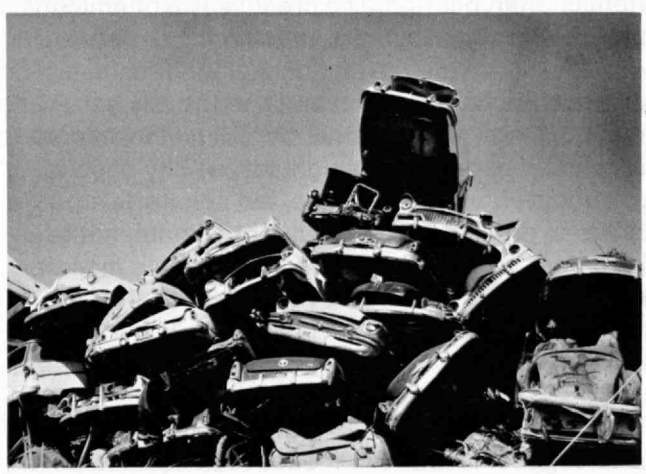


H. Armstrong Roberts

reflect and support it. These policies may sound innocuous but are in fact dangerous. Change and growth are disturbing; they upset vested interests and are painful (as well as exhilarating). If we engage in them, we must be prepared for trouble.

Experimental Communities

Just as we look for an environment conducive to growth and learning by its inhabitants, so we also want one that will itself "learn," that will respond to the varying needs of its users and provide a stream of new possibilities for trial and evaluation. Think of a room which responds to the man who enters it: his preference for temperature, his need for light according to the task, his mood for color. We already have some of these devices: the light switch, the thermostat. At the city scale, the task is technically far more difficult, and it is complicated by the variety of simultaneous users.

We can conceive of large environments which respond to outside changes to maintain some average preference, as street lamps turn on when darkness falls. It would also be possible to build public spaces that would respond to the cumulative effects of users: opening up or decreasing the acoustical reflectance or changing the temperature as crowds change in size. Alternatively, we might amplify an effect as by re-projecting views of a crowd to itself, or re-broadcasting its noise, or by allowing its actions to program changes in light and sound. Where the outdoor environment can be controlled on a fine scale, and users are relatively sparse, there are other openings: outdoor radiant heat or light which can be turned on or off at will (or even "track" a traveler), retractable shelters which open out at need. Over a longer time interval, buildings might grow, contract, or otherwise adapt to the activities they contain. People should be able to take on environmental control as they wish, up to the level of intrusion on their neighbor.

The symbolic environment might be similarly organized; signs could expose only the most general information to the casual viewer and respond with details when queried. The creative use of ambient factors—artificial light, sound, modified climate, even smell—is a large and unexploited realm in city design. For example, much of the city experience is a nighttime experience, but no city has yet attempted to design the nightscape. City people are vocal about their climate, but no efforts are made to provide a varied outdoor climate, not even an indoor one which is more than a single monotonous standard. A rich and varied responsiveness is what we mean when we plead for a more "human" environment.

If environment should respond to the user, it should also suggest to him new modes of action and perception. New shared experiences may bring men together over the gulf of traditional divisions. We should be trying out settings which offer the possibility of different styles of life: residential areas based on new ideas of family organization; new systems of space organization; new ways of sensing the surroundings; schools completely dispersed throughout other activities of the community; mobile temporary and shifting environments; very high-density areas using new techniques for communication and privacy; moderate density zones in which families have the independent control and access now associated with the single family house; or "isolated" rural settings in the midst of the urban region. The means of evaluation must be built into these designs.

To take one example, new technology will soon allow us to occupy marginal areas on which increasing wealth and population will as soon place mounting pressure. We should prepare for the rational exploitation of these hitherto "waste" areas. This means exploratory design and pilot experiments for settlements in the desert, on (even under) the water, in extensive swamps, high mountains, arctic regions, underground. Use of these areas may be forced upon us, here or elsewhere in the world, but they may also turn out to be highly desirable habitats, once the adverse conditions are removed. We shrink at the thought of such places—they would be strange, artificial. But the problem is not one of a natural versus a synthetic world; all human environments are natural, and most of them are synthetic. The problem is how to make these new worlds humane, by taking account of our psychological limits and abilities; and how to give them a rich and stable ecology. Occupation of sea or mountain may increase the diversity and delight of our landscape.

Thus there are cogent reasons why we should begin now to make environmental experiments on a substantial scale. They will be expensive. They will be seen as disturbing to the existing order (indeed they are), even immoral. They may have to be geographically isolated, or located in areas where tolerance is high, or restricted to spatial experiments without obvious social connotations. But these experimental communities could become the laboratories of our society, a new sort of university where people are not experimented upon but join in conducting experiments in which they learn about themselves and their own possibilities.

It may be apparent from all this that, while I see metropolitan growth as a magnificent future opportunity for the improvement of our environment, I do not advocate a special form nor a single strategy. On the contrary, I propose a plurality of actions and many levels of control. I emphasize neither restriction of size nor starting with what seems to be

a "clean slate." The critical problem is to manage metropolis as a vast ongoing system, monitoring the growth and quality of the environment as a whole, and concentrating public efforts at the key points of development. There are a number of strategic opportunities, of which the most attractive seem to be planned development and resettlement at the fringe; creating new open space and transportation systems; organizing a new set of intensive centers; building a sophisticated disposal and maintenance technology; developing the techniques and institutions which will facilitate environmental change and also justly allocate its costs; and conducting environmental experiments. These opportunities are easily lost, but the act of changing the environment can be a potent weapon for mobilizing hope and social action.

This paper has focused on the problems of the city in this country. I do not imply that we can ignore the convulsive changes occurring elsewhere in the world. Morally, we cannot turn our backs on the poverty of the colonial world, nor refuse to support the awakening of its people. Realistically, if we do, we will spend our attention and our resources on destruction and "defense." Urban policy is tied to foreign policy. Our predicted affluence and decline in the need for human labor is either chimerical or fragile, in the face of the desperation inside and outside our borders. Whether due to commitments for international aid, or cost for war, we can expect that our resources for internal urban development will continue to fall short of need. Our aim must be to use those limited resources to encourage human growth, and not to find ways to "use up" goods or leisure time.

Opportunities and Actions

The strategic impression is imposed at the point of development. We need to build the agencies which can carry out development at the scale now required, while avoiding the centralized control over detail that such large-scale action seems to imply. To concentrate the necessary skill and capital, these agencies will probably have to be mixed public and private authorities, with special powers of acquisition and development, but operating under local and national regulation. They need not be tied to one locality, but should be free to apply themselves throughout the nation, and perhaps elsewhere in the world. They would be called in by localities—cities, small neighborhoods within cities, or metropolitan regions—or perhaps by other nations, to carry out specific development tasks. Some authorities might be quite large and comprehensive in their abilities, others small and specialized. All of them, by virtue of their public component, and in return for such powers as condemnation, would have mixed criteria of performance, including the well-being and development of the user as well as the return on capital. They would, moreover, be constrained to work within the policy guidelines of the locality engaging them.

We also need a means for accomplishing environmental experimentation. Work must be done on new techniques for adaptability, as well as on the innovative design of centers, of open spaces, of circulation systems, and of local site planning. Exploratory design should be underway on possible new habitats, and experimental communities must be designed, built and tested. Laboratories should be engaged in fundamental research on the interaction of user and environment, developing new criteria, and acting as "look-outs" to discern new opportunities and possible futures.

When massive new powers or funds are applied to a problem, there is always a danger that they will be diverted to ends far removed from their original ones. Urban renewal is a well-known example. Many of the above proposals could be deflected in ways not now foreseen. Their exploration must therefore include a study of how they could be turned to other purposes.

A fundamental difficulty will be the resistance to change that will be encountered: the privileged interests, the fears of racial integration or of other social change, the just apprehensions of the displaced. Since our possible city is based on change, there must be provisions for identifying the social and economic costs of change and for fairly allocating them by charges, subsidies, or replacements. Since we will also encounter less rational fears, we will be constrained to begin at points where there is already some consensus: circulation, open space, new suburban development, insertion of new activity into unused interstices in the existing fabric, attacks on pollution, climate, and noise, experiments with new possibilities for the physical fabric of the city.

If I seem to prophesy a bright new technological future, I am misread. My purpose is to encourage human beings to grow into their diverse potentialities, and to find a possible city to do it in. Technology and environment might be exploited to that end. They will subvert it, if left to develop in their present course.

Kevin A. Lynch has been a member of the M.I.T. Department of City and Regional Planning since 1948. He is a recognized authority on urban form, a consultant on many urban projects, and the author of two books, *The Image of the City* and *Site Planning*. "The Possible City" is abridged from the paper appearing in *Environment and Policy: The Next Fifty Years*, edited by William R. Ewald, Jr., to be published in 1968 by Indiana University Press.

100,000 People in One Square Mile

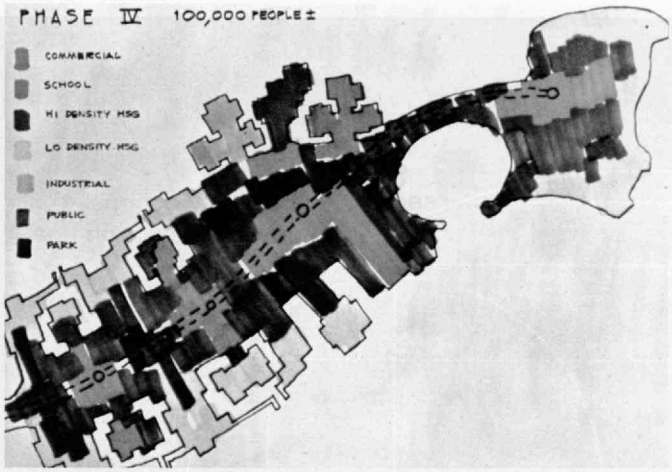
How can 100,000 people be accommodated in an efficient and attractive environment on one square mile of land—a density found in few places outside of Manhattan? This was the problem—with the additional proviso that the solution preserve adaptability of land and building use—handed to two groups of M.I.T. graduate students a year ago by faculty in charge of courses in systems engineering and transportation systems design. Though the solution was to be prototypical, not tailored to any particular site, the students decided that their plans must be conceived for some envisionable situation, so they chose to concentrate upon a development of Thompson Island in Boston Harbor.

The result was Project Romulus, the full report of which will be published later this year by The M.I.T. Press. Its proposal is for the linear city shown on the opposite page, with industrial and residential density concentrated along a single main transportation artery with "feeder" systems spreading from it. But the students emphasize that "the two-dimensional representation is inadequate, because many of the activity areas would overlap in a three-dimensional manner and over time many areas and buildings would serve multiple evolving functions in this mobile environment."

Modular construction is at the heart of the plan for adaptability. The students propose factory-built activity modules, self-contained living or office units, to be used on "module trees" consisting of structural frames and utilities or on floating foundations for water-based areas. Together, these alternatives make possible changing the uses of any particular buildings or parts of them, and the floating foundations suggest the possibility of moving entire buildings from place to place as needs change. The modules are set up so that a family who wants to move from one part of the city to another simply unplugs its living quarters from one structure and puts them in another; or, if the family grows, they can add another module on the structure where they live.

The circulation plan makes use of two levels. The main artery, an automated guideway, is on the lowest level; above it is a "transportation plane" which will consist of a pedestrian mall for the central portion of the island; the idea, the students said, is that "distribution routes can be rearranged to meet shifting demands, with relative independence of building locations."

The students also investigated the possibility of covering the entire island with a weatherproof dome; however, they said, "our analysis of costs and benefits suggest that only smaller domes should be used, for special areas." Throughout our city, they said, "we would seek to emphasize the comforts, conveniences, and communal qualities that a city can offer, such as multiplicity of choice, active recreation, and protection from the elements."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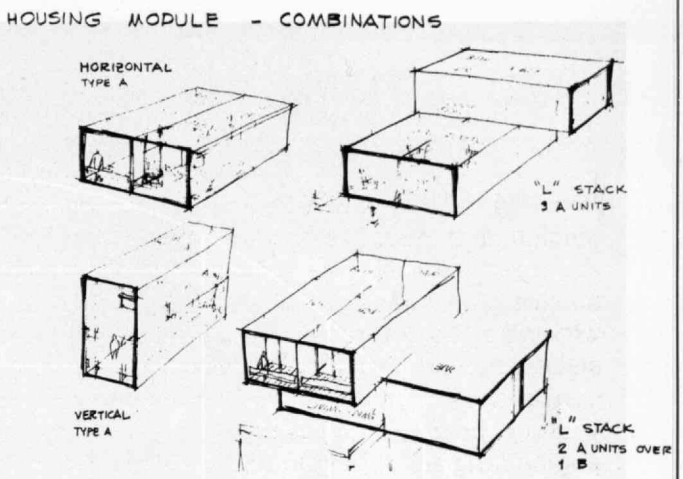
HOUSING MODULE - COMBINATIONS
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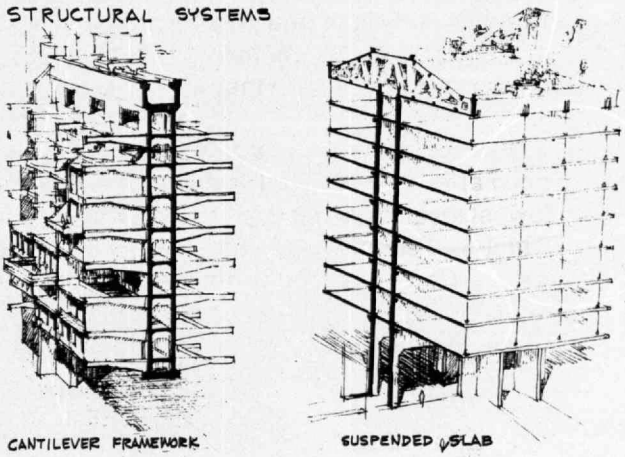
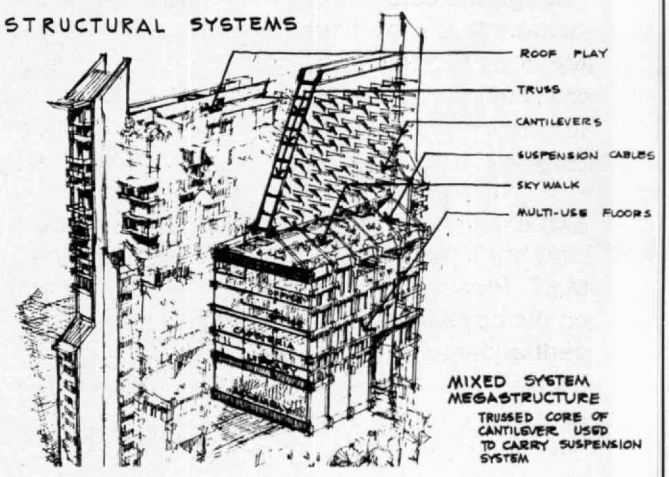
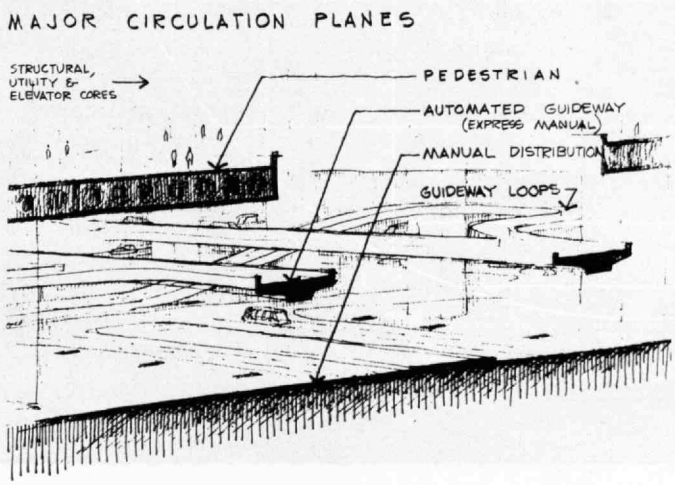
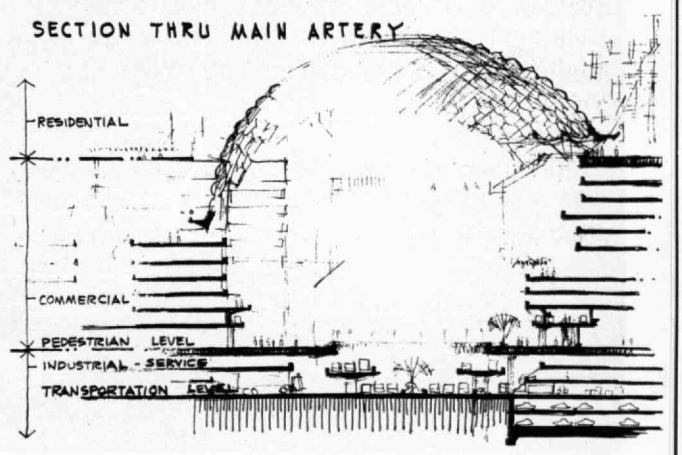
"L" STACK 3 A UNITS
VERTICAL TYPE A
"L" STACK 2 A UNITS OVER 1 B


STRUCTURAL SYSTEMS
CANTILEVER FRAMEWORK
SUSPENDED SLAB


STRUCTURAL SYSTEMS
ROOF PLAY
TRUSS
CANTILEVERS
SUSPENSION CABLES
SKY WALK
MULTI-USE FLOORS
MIXED SYSTEM MEGASTRUCTURE
TRUSSED CORE OF CANTILEVER USED TO CARRY SUSPENSION SYSTEM


MAJOR CIRCULATION PLANES
STRUCTURAL, UTILITY & ELEVATOR CORES
PEDESTRIAN
AUTOMATED GUIDEWAY (EXPRESS MANUAL)
MANUAL DISTRIBUTION
GUIDEWAY LOOPS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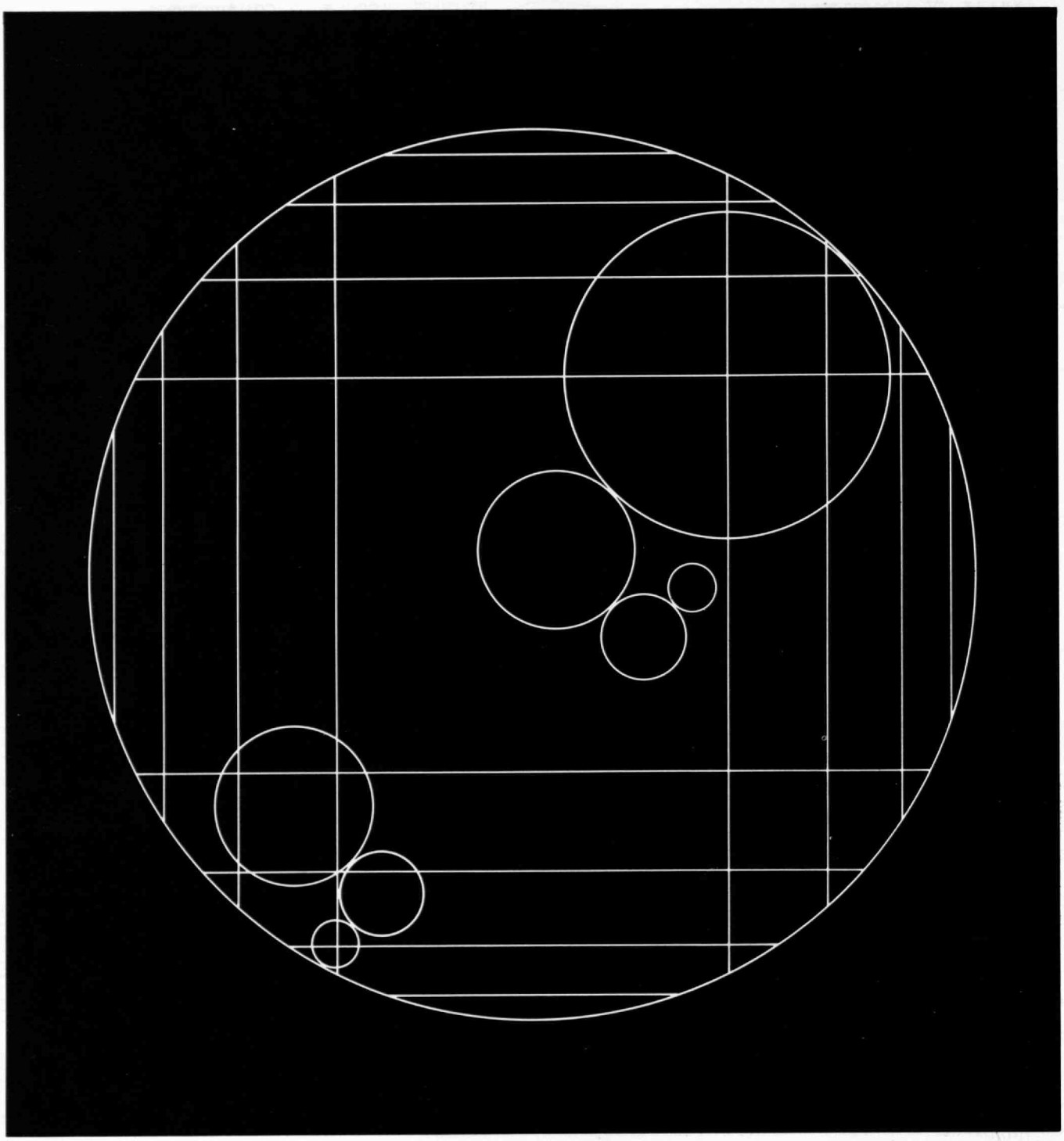
TRANSPORTATION LEVEL



Housing, jobs, and services are not enough; tomorrow's metropolis must offer all its citizens participation in their urban destiny

Robert C. Wood

Rediscovery of the American City

The storms of urban discontent which have broken over American cities were neither unexpected nor inexplicable. But they have produced a torrent of commentary and explanation and a sense of urgency and concern with our urban civilization that was lacking in earlier years.

All of us in the urban business welcome the public's sense of heightened urgency and broader concern. However, the solemn predictions of disaster and the panicky search for panaceas are another—and disturbing—matter. Urban problems we have aplenty—an inventory of ills assembled over years of indifference and inattention. Yet the potential for city-building in the United States grand in scale and fine in quality has never been greater. We are in fact further along in understanding the urban system, in developing the capabilities to direct it, and in deciding in what direction it should go than most Americans appreciate—or, given the decades of neglect, than we probably deserve.

The foundation for this optimism is principally that the characteristics of reason and problem-solving which give validity to science and technology are now being applied to urban affairs. We are beginning to define and study urban behavior systematically. We are coming increasingly to understand the city as a system of many variables in precise and accurate terms, as a complex set of relations of people and space involving many dimensions. This may sound theoretical, but an accurate description of the phenomenon is a prerequisite for guiding it; until very recently there was a clear and present danger in urban scholarship of analyzing our cities' ills solely in terms of race. We are beginning to develop a balanced capacity to design and build better city systems; we are learning that, as in all great national endeavors, manpower, understanding, talent, and commitment are as important as money. We are beginning to realize that our task is city-building in the broadest sense of the word everywhere across this continent; our concern is not only the ghetto and the ghetto resident but all urban dwellers and all parts of the urban complex. In short, we have come to know that urban conditions of stability or instability, squalor or decency, efficiency or inefficiency, beauty or ugliness, are not the function of single factors.

They are not the result only of obsolescence of our housing supply, the changing requirements of industrial location, a radical change in the character of the jobs technology makes available, the vast migration of rural citizens to strange and complex urban circumstances, discrimination, the desire of new urban residents to be heard, the hostility between generations, or the increase in sheer numbers.

The urban condition of America today is the result of all of these. The issue is not the intuitive search for the single thesis; the issue is how to weigh and take into account, on some weighted basis, the play and pull of all these varied forces.

Where one appreciates that a problem is complex and subtle, not responsive to massive undirected applications of energy or simple professions of good will and heartfelt concern, one is likely to search for a reasonably comprehensive and carefully developed response. This is the second reason for some optimism for urban America. Our public policy today, proposed by the President and enacted by the Congress, is of that character.

In the tumult of last summer, it is easy to forget—but vital to remember—that the urban aid legislation enacted in 1965 and 1966 was designed to remove the causes of the tumult. We have now more than 60 new efforts underway to provide more housing for those who desperately need it. We have for the first time leaders of private enterprise focusing their talents and energies on the nation's most pressing urban problem, which is housing.

The Model Cities Program of the 1966 Act is designed explicitly to bring comprehensiveness to the rebuilding of older portions of older cities. It will

provide more housing. But, more than that, the Model Cities Program seeks to restore all aspects of the neighborhood environment—by merging social, physical, public and private programs from many sources into a total attack. For the first time, it introduces quality control into urban rebuilding. For the first time, it offers bonuses to stimulate local innovation, local ingenuity, local solutions of local problems. The Metropolitan Development Program of 1966 would reward and therefore encourage collaboration between local governments. Finally, there is the new program to stimulate the development of entirely new communities which offers the hope of fresh alternatives to urban living.

Taken together, these new efforts, all of which are now in process of first funding, represent a reasoned strategy. They are designed to expand the freedom of choice for urbanites, to increase our options for where we seek to live, to work, and to invest our leisure time.

Their principal limitation at this time is the size of the investment for which they call. But here, amid calls for billion-dollar emergency funds, and a 30-billion-dollar housing investment, three comments are in order. The urban professional recognizes that all three levels of government and the private sector as well must be involved in the process of building and rebuilding our cities. The federal investment is not the total investment, as it is in space or national security programs, and those who make facile comparisons of just the gross federal budget are either amateurs in urban affairs, or—worse—actors engaging in political chicanery. Today's urban professional also recognizes that the investment of economic resources alone does not assure effective capacity. Talent and knowledge are equally essential components, and our shortages in each are awesome. The urban professional recognizes that the true test for an effective urban response is how it helps people. An effective program, at a minimum, involves an appreciation of the needs of the human personality and the human spirit.

It is no less true today than it was at the opening of this century that "the greatest of evils and the worst of crimes is poverty." Help these days is more than more urban renewal funds, more jobs, more housing. Help is all of these, and help is law and justice, too. Help is communicating with those who now feel debarred from our society and therefore debased. It is assurance of genuine participation in the process of city building and neighborhood restoration. It is assurance of access to those in authority, a share in decision-making.

It was this desire to show tangible, visible concern for the current conditions of the poor—and to take at least one specific step to eliminate at least one shameful condition—that led us to propose the so-called Rat Control Bill to the Congress. Those members of the House of Representatives who thoughtlessly laughed it out of the chamber, and those outside observers who wrote it off as budgetary trivia and therefore of no consequence, underestimated grievously one whole dimension of the urban challenge.

Admittedly, human concerns are the most elusive elements of a truly capable response. Effective programs and activities are evolving slowly from the trial and error, and success and triumph, in our economic opportunity programs. But they are vital components, and those who would have us return to New Deal days of providing dole for the poor do a major disservice. I cannot believe that we do not have the ability to engage our urban poor in democracy nor any prospect of increasing their competence to deal with urban life today.

So understanding the pattern of urban development as a complex system and fashioning a capacity with manpower and know-how, as well as money, to respond to the urban challenges are two processes that are under way. But unless we are prepared to deal with our urban future as well as correct the mistakes of our urban past, they will not be enough. That is, no genuine urban response is sufficient that focuses solely on the American

core city or identifies only the urban poor as the beneficiary of our public and private policies.

The truth is that the entire pattern of urban development from central city to suburb to exurb, is robbing us all of genuine freedom. We are all losing the choice of a clean, healthful and pleasing environment—with pure air and water, and landscape unimpaired by destructive building processes. Unplanned, unguided, sporadic urban development cheapens our common environment and places prohibitive prices on land and improvements. As we prepare for the generation of city building that lies just ahead—when we distribute 100 millon more Americans across the continent in the next 30 years—these costs, this waste and despoliation shape a common cause among the urban poor and rich alike. How do we build our new communities on a geographical and numerical scale unanticipated even 20 years ago and still retain a genuine sense of community? What modern counterparts do we have for barn-raisings, street dancing, Fourth of July celebrations? Where are our new village greens and town commons?

To rediscover community on a larger scale will surely mean making real again the old colonial adage, "You are as good as any man—and better than none." Our increasingly urban character serves to make more compelling than ever the fulfillment of the promises of democracy. Open occupancy is a rudimentary necessity of an urban civilization today. But genuine community building in our urban circumstances will require more positive action. Urban and suburban communities alike must recognize more explicitly that they have common concerns and common obligations.

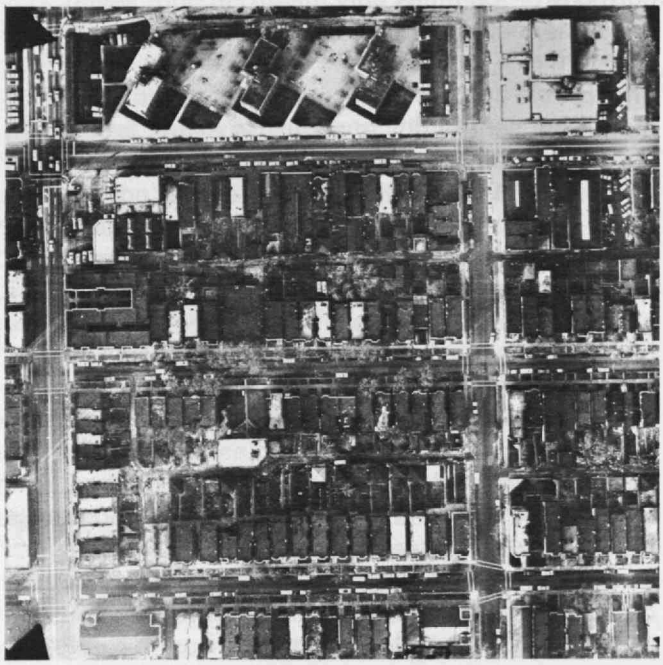
If we provide genuine variety in occupations, in income, in race, and religion in cities and towns across our metropolitan regions, we accomplish two other things simultaneously: We insure that no single part of the new urban community has to care for the majority of the poor, the old, and the helpless; and we provide the excitement of variety and complexity to the human experience in all parts of the community.

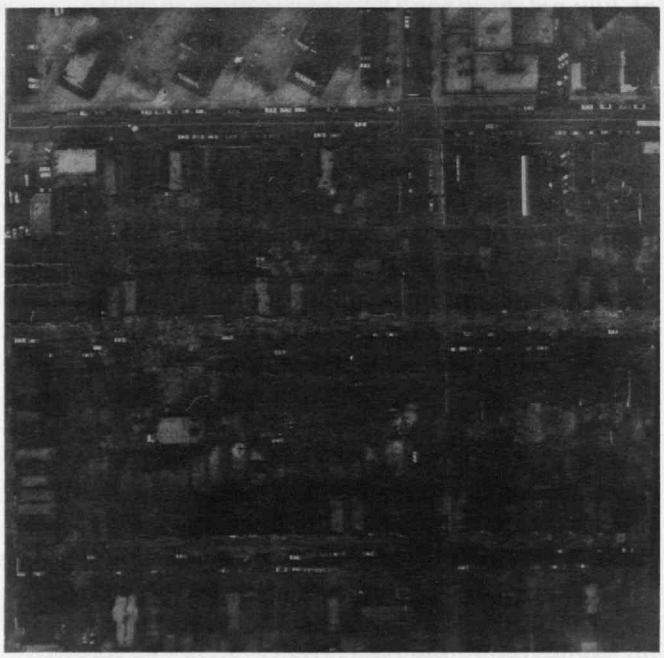
These are aspirations of community life yet to be realized, of course. Major changes in public attitude, in private industrial performance, in labor practices, in governmental patterns of behavior must occur before they are fulfilled. But these are the objectives to which present, established national policy is committed.

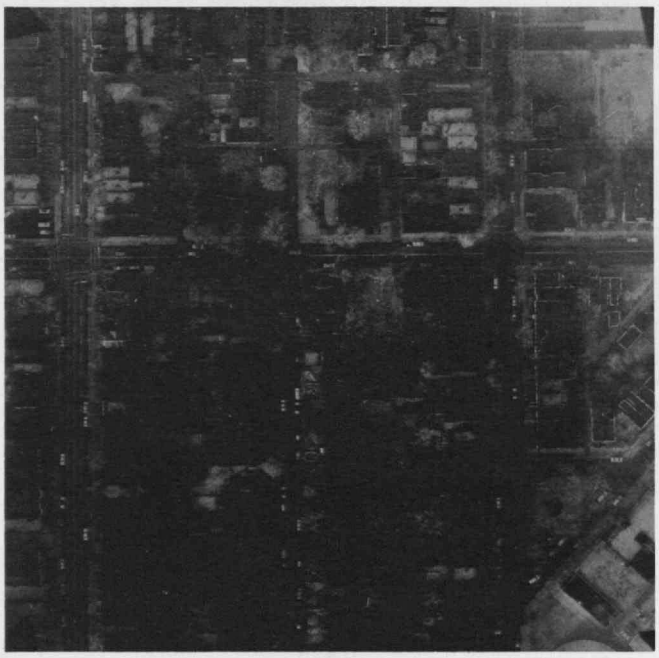
Those, then, are the bases for urban optimism. Urban programs fashioned by reason and not illusion, emphasizing practical and tangible results, committed to quality, are now under way. They will not immediately quiet urban discontent nor instantly make competent citizens of the newest migrants from rural circumstances. They will not magically introduce effective local land development and tax policy, nor will they easily eliminate hazards to health and beauty. They never will—without expanded and sustained commitment on a scale never before undertaken. But given such commitment and common effort the America of the Twenty-first Century will offer its urbanites greater hope than they have ever held before.

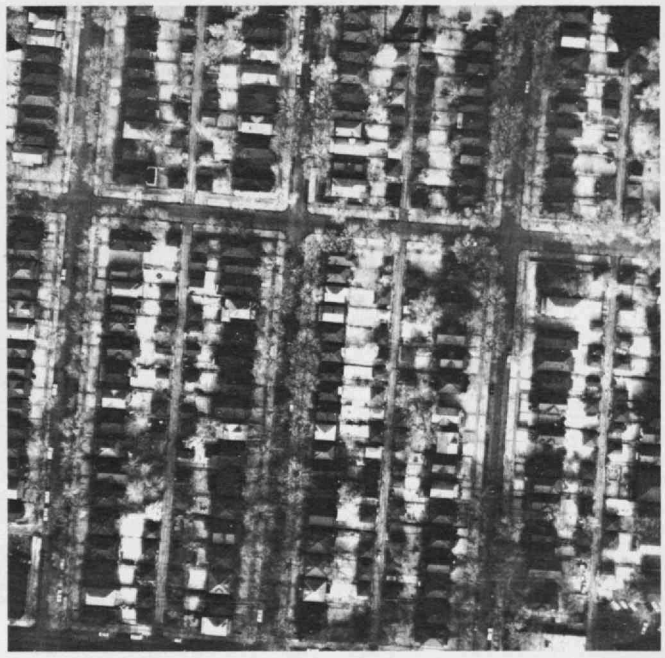
Robert C. Wood, Under Secretary of the Department of Housing and Urban Development, is on leave from his post as Professor of Political Science at M.I.T. He studied at Princeton and Harvard and before coming to M.I.T. had served with the Florida Legislative Reference Bureau and U.S. Bureau of the Budget and on the faculties of Harvard and Syracuse Universities; he was a member of President Kennedy's Task Force on Urban Problems and of President Johnson's Task Force on Urban and Metropolitan Problems.

Northwestern University geographers think that a special combination of conventional and infrared aerial photography—and eventually satellite photography—may be an important tool in urban studies. The conventional photographs show the land use while the infrared images show the quality of the land itself. In the pair at the left, high housing density is revealed in the conventional photograph, and the infrared photograph shows that what little ground area remains is almost devoid of grass and trees. In the higher quality neighborhood at the right there is variety in housing style, lower residential density and (as seen in the infrared image) far more planting. (Photos: Duane F. Marble and Barry S. Wellar from Northwestern University.)









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Trend of Affairs

Food from the Atom

Adlai Stevenson once said that by means of nuclear science and engineering man could "make the world a desert or make the deserts bloom." Researchers, hoping to resolve world food problems with the latter approach, have in recent years been proposing to turn coastal deserts into irrigated croplands by drawing from the sea vast amounts of water and converting it to fresh water in nuclear reactor systems.

Moreover, even as the water conversion takes place, such a reactor produces vast amounts of electricity, also for use in bringing living in underdeveloped areas to fuller bloom. The technology for such agricultural-electrical complexes has come of age—nuclear energy in large reactors can now compete with fossil fuel, and breeder reactors now under development may, in the not too distant future, be the cheapest form of energy of all. Furthermore, great progress has been made in desalinization techniques in the past year. Yet for relatively underdeveloped countries, the cost factor for nuclear energy is still generally considered beyond the realm of economic consideration.

A concentrated study on ways in which nuclear complexes could be designed and utilized to benefit underdeveloped countries was started last June at the Oak Ridge National Laboratory in Tennessee.

The study group, led by Edward A. Mason, Sc.D.'50, Professor of Nuclear Engineering at M.I.T., was composed of experts in nuclear power and chemical engineering, economics regional planning and agriculture, from government, industry and the academic world. This team spent the better part of five months investigating the potential for the application of huge agricultural-industrial complexes. In these, electrical power generation and advanced evaporator desalting techniques would be integrated with large-scale irrigation systems and with the production of energy-intensive chemicals and metals—including fertilizers, which could be used to grow agricultural products at the complex site and elsewhere.

Life stream of the complex would be steam, produced in nuclear reactors, which would first be dispatched under high pressure to a turbine-generator plant to produce power. From the generator, low-pressure steam would be drawn off and used in large-scale evaporators to convert sea water into distilled water for use in the fields and in the industrial complex. In turn, the electrical power produced by the turbine-generator would provide the industrial complex with a raw material for making chemicals, fertilizer and salable metallurgical end products.

Those participating in the study believe that, through low unit costs per product, such large-scale integrated complexes will in the long run be more economically attractive than will smaller, non-integrated power and industrial plants having higher individual unit cost of production.

Faced with the fact that a single big reactor might produce more electricity than an emerging nation with a relatively low industrial development could use, the project investigators point out that if an associated industrial complex also is constructed, it can consume all the power generated and also can produce chemicals, metals and fertilizers for domestic use or for sale in world markets.

The cost of desalted water—considerably more than that of river and rain water usually used in agriculture—was another problem to be resolved. The Oak Ridge team's answer: the effect of this higher unit water cost could be offset by reducing water consumption through increased crop yields. Such an increase could be realized through intensive agricultural techniques in which seed, water and fertilizer are applied at exactly the right time and in the right amount. A large farm so operated might literally be called a "food factory."

The nuclear researchers, backed up by industrial and agricultural consultants, estimate that such a food factory irrigated with 600 million gallons of water a day would produce enough food on a 140,000-acre farm to feed three million people. It would also produce enough ammonia to fertilize both on-site crops and to nurture additional off-site grain sufficient to feed as many as 20 million people.

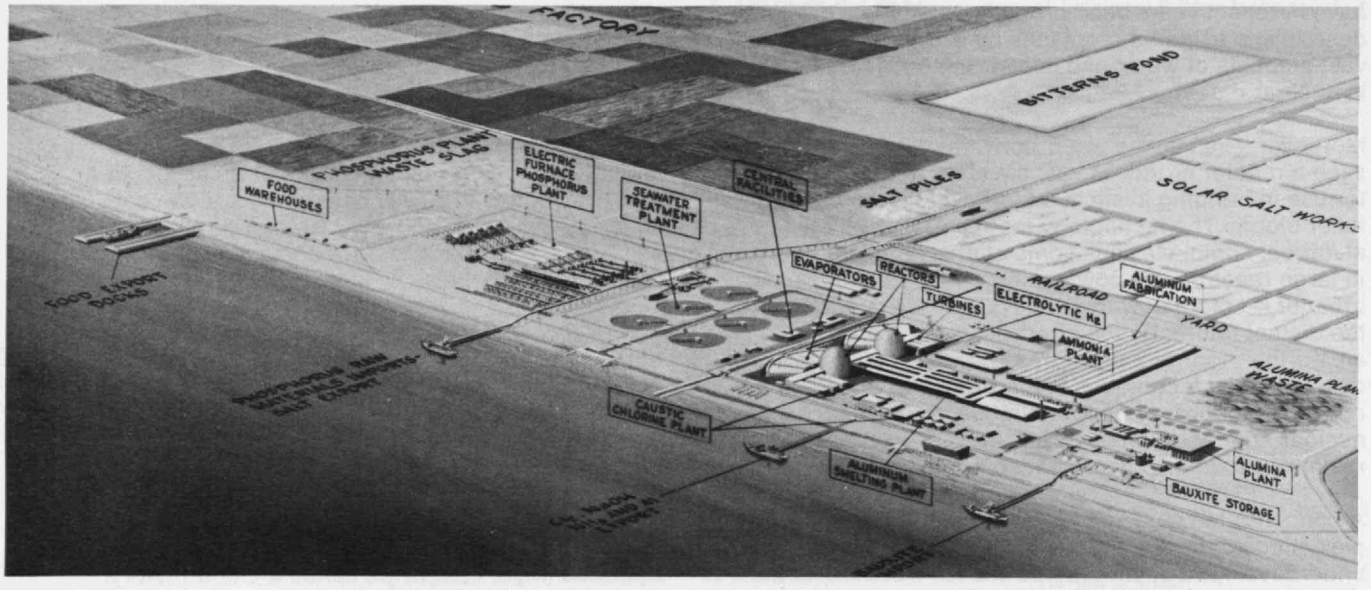
As to the industrial segment of the complex: Hydrogen would be produced electrolytically and converted to ammonia and nitric acid or used to reduce iron ore. Aluminum could be wrested from bauxite, and copper could also be produced by electrolysis. Electric furnaces could be used to convert phosphate rock to elemental phosphorus. An arc process could be employed to manufacture acetylene and ethylene. Other industrial processes that could be carried out at the complex include the recovery and production of magnesium and the production of caustic, chlorine and chemicals used in plastics.

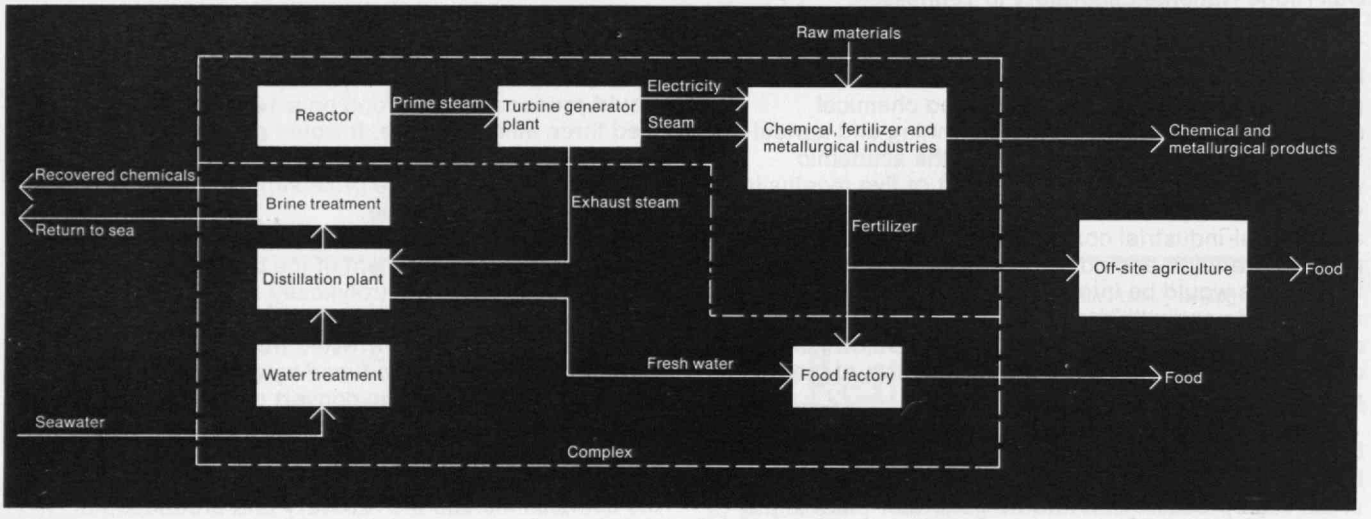
Details on the potential of the proposed agro-industrial complex were given in September by Atomic Energy Commission officials to members of the Senate Foreign Relations Committee. In November, Professor Mason and several of his associates carried their investigations

a step further—flying to India and the Middle East in order to obtain data on specific sites for proposed development.

The details of financing such an ambitious plan are still to be resolved. The Oak Ridge study group estimates that it would cost between $400 million and $1 billion, depending on the industrial mix, to construct a one-million kilowatt reactor-industrial complex on an overseas site. If a 500-million-gallon-per-day evaporator and food factory were added, the initial cost would rise by an additional $400 million. Financial experts who have reviewed the proposal say, however, that the constructor of such a complex may well realize a 10 to 25 per cent annual pre-tax return on the investment from the sale of the various products emanating from the complex. Perhaps, suggests retired Admiral Lewis Strauss, a pioneer in the nuclear energy field, the development of such projects could be carried out by the formation of an international corporation somewhat along the lines of the Communications Satellite Corporation.

In the long run, however, cost may not be the only consideration in studying such proposals, says Glenn T. Seaborg, chairman of the Atomic Energy Commission. In a recent speech before an international conclave of scientists, Dr. Seaborg pointed out that such a project, "would require great advance study from a technical, economic and social standpoint. It would require a massive infusion of capital into an undeveloped area. And it would take, above all, the devotion and hard work of a great many talented people to put the plan into operation, to train operating personnel on all levels and to establish a community that could successfully carry on such an undertaking once the initial corps of experts had left. Many people, however, envision such a program as a potentially important step toward a lasting world peace."—*Ellison W. Smith.*



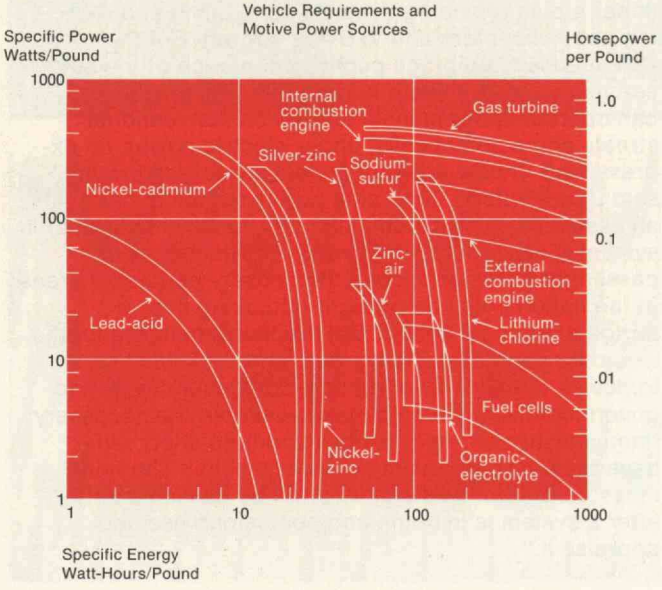


Agro-industrial complex proposed to produce power, food and industrial products for water-poor underdeveloped countries. Steam from nuclear reactors would produce power in a turbine-generator plant; low-pressure steam drawn from the generator would fuel large-scale evaporators converting seawater into distilled water for use in the fields; and power from the turbines would supply the energy to manufacture chemicals, fertilizer and metallurgical products. (Photo: Oak Ridge National Laboratory)

Toward a Benign Car

The automobile is by far the largest single source of air pollution in the world; yet in half a century it has become a necessity to U.S. life and commerce and a major factor (30 per cent) in U.S. annual gross national product. But today the nation is challenged to replace the automobile or to make it vastly more benign. This is the position of the Department of Commerce's Panel on Electrically Powered Vehicles, and the chairman of that Panel—Richard S. Morse, '33, who is a Senior Lecturer in M.I.T.'s Sloan School of Management—says it is "going at the moment as well as it can."

Today the Congress and the Executive Branch of the government are hard at work to chart a course of future action, based on the findings and recommendations of the Commerce Department panel: that for the immediate future there is no substitute for the internal-combustion engine for automotive power, but its contaminating emissions can be markedly reduced by techniques now within the state of the art; that the use of some contaminants—notably lead as fuel additives—should be reduced immediately; and that intensive programs of research on alternative engines and transportation systems should be mounted at once by government and private agencies working together. Already there are co-operative research and development efforts in the automotive and petroleum industries on such questions as unleaded gasoline and lower-compression engines.



While it represents the first major study of this source of air pollution, the project has significance, too, Dr. Morse believes, because it represents the successful use of a new mechanism for bringing government, industrial, and academic talent together in the national interest. His job as panel chairman was mainly a "management organization problem," Dr. Morse says, to use effectively the many talents which were offered to the panel's membership; it is a good example, he thinks, of how the nation and especially the states could go about approaching other problems in the broad public interest.

In addition to Dr. Morse, several members of the M.I.T. community had major roles in the panel's work; among the panel members were Rolf Eliassen, '32, Professor of Environmental Engineering at Stanford University, and David V. Ragone, '51, now Professor of Metallurgy and Material Science at Carnegie-Mellon University. Glenn C. Williams, Sc.D.'42, Professor of Chemical Engineering at M.I.T., was a member of the Subpanel on Current Automotive Systems; S. William Gouse, Jr., '53, Professor of Mechanical Engineering at Carnegie-Mellon, of the Subpanel on Energy Storage and Conversion Systems; Morris A. Adelman, Professor of Economics at M.I.T., of the Subpanel on the Automobile and the Economy; and Siegfried M. Breuning, Sc.D.'57, of the M.I.T. Department of Civil Engineering, of the Subpanel on Transportation System Requirements.

The internal-combustion engine combines high power with high capacity per fuel charge—characteristics which make it a uniquely effective power plant for automotive applications as they exist today. The chart shows that external-combustion (steam) engines offer many of the same advantages and fuel cells offer some of them. But no battery known today challenges the gasoline engine as a power source for a versatile automobile that can travel at high speeds, accelerate, and climb hills. Whether alternatives of more limited scope could succeed on the American market, as people find ways to use their special advantages, remains a topic of speculation; but "research, development, and demonstration of transport alternatives that involve departures from current performance and design characteristics should not be ruled out," said the Panel of the Commerce Technical Advisory Board studying the automobile and air pollution.

Incentives and Values

Is the free-enterprise system incapable of protecting us from the dangers of our ever more complex technology? And do universities fulfill their responsibilities to study and predict the growing relevance of modern science? The national debate on how to deal with and predict unwanted effects of technology while developing and benefiting from the wanted ones found its counterpart on the M.I.T. campus during the 1967 Williams Lectures. Two sentences typify the contrasting views:

J. Herbert Hollomon, '40, former Under Secretary of Commerce who is now President-Elect of the University of Oklahoma: "The future of our culture depends significantly on our being able to control and manage the consequences of technological change."

Jerome B. Wiesner, former Assistant to the President for Science and Technology who is now Provost of M.I.T.: There is a "danger of becoming 'muscle-bound' by too much planning and too much control."

Dr. Hollomon delivered two lectures on "Technology and the Public Interest" as the Williams Lecturer; Dr. Wiesner was one of four panelists convened to add their own perspectives on the issues. The result was a lively campus discussion of public policy issues unprecedented for the lectures, sponsored annually by the Department of Metallurgy and Materials Science in honor of the late Robert S. Williams, '02, who was a member of the Department for nearly 20 years.

Dr. Hollomon contended that government and public bodies—such as universities—have to enter the arena when the problems generated by technology become too broad in scope and when they affect third parties in whose behalf the private enterprise system offers no incentives. Nuclear energy and the modern urban crisis, precipitated by decreasing farm employment resulting from new agricultural technology, are examples of the former; automobile safety, water and air pollution, and the extension of modern technology to underdeveloped nations, of the latter.

The future holds still more vexing problems: What are the responsibilities of those who succeed in modifying the weather? Who owns the off-shore mineral deposits which we are about to exploit? How do we assure appropriate privacy for our citizens as we develop the techniques to "eliminate" it? How do we evaluate the benefits and the costs, in money, resources, and noise, of the proposed supersonic transports?

What we need, concluded Dr. Hollomon, are new ways to connect technology and our value system, and the universities must provide it. The growing role of the federal government in underwriting technological change means, according to Dr. Hollomon, that only in universities, and particularly in places like M.I.T., can these value problems be tackled with "objectivity and enthusiasm." "Yet," said Dr. Hollomon, "I know of no university, no group of people, who got at the facts" of traffic safety, who studied the "social cost of automobile accidents" and the ways of reducing it.

None of the panelists denied this challenge, but all introduced elements of equivocation. Harvey Brooks, Dean of Applied Science at Harvard, emphasized the role of the public in these evaluations and suggested the need for better "attention management." Gordon S. Brown, '31, Dean of the School of Engineering at M.I.T., said that an element of human restraint "that does not exist in the culture of our society" must now be added. Dr. Wiesner, recalling his days with President John F. Kennedy in the White House, spoke of our cultural decision-making processes as a kind of information system, with feedback loops to control instabilities and reduce the scope of errors. And Eugene B. Skolnikoff, '49, called attention to the effect of changing technology on our value systems—an effect which makes it harder to predict appropriate responses to future problems.

Needed: Act of Faith

Neither proliferating traffic jams nor air pollution (*see page 57*) spells the demise of the automobile as the nation's standard of urban transportation. Indeed, William W. Seifert, Sc.D.'51, has told a panel convened by the Organization for Economic Cooperation and Development in Paris that even if viable alternatives were available now the automobile "is so entrenched in the United States way of life that our present high reliance on it would continue for many years." It is now used for 85 per cent of all urban trips; by 1985 it will be used for over 90 per cent of them. He believes that the solution to our traffic problems is an automated highway system which combines the automobile's flexibility with mass transportation's speed and capacity, and that such a system could be built in 15 years.

Rail systems will offer little competition for the automobile. The basic problem, as Dean Seifert described it, is that a new rail rapid transit line must carry approximately 15,000 passengers per peak hour, or about 60,000 trips per work day, to be profitable at a fare of four cents per passenger-mile. Relatively few cities have developed to the size, and with the form required, to generate this number of trips along well-defined corridors, he said.

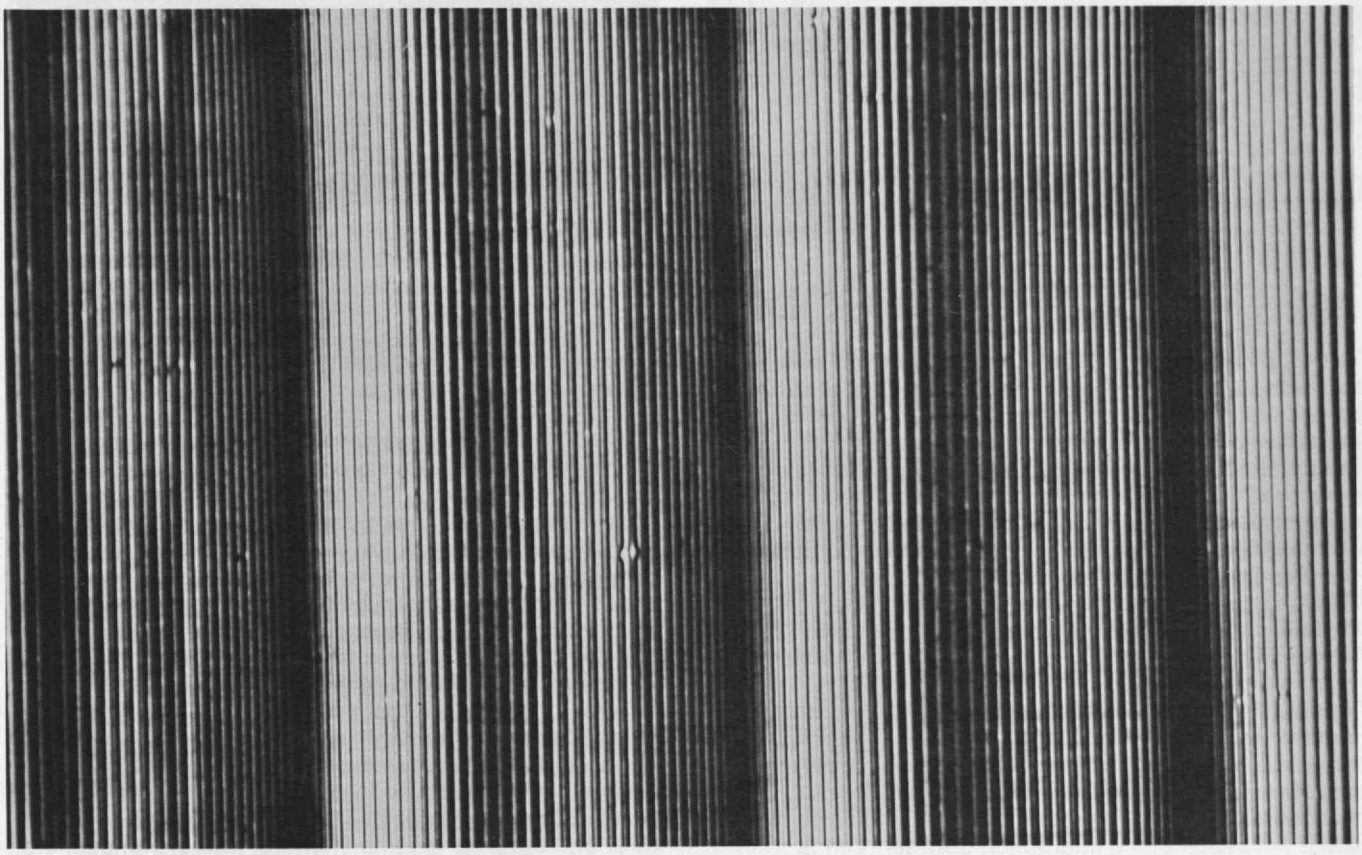
Among the more immediate alternatives, he said, are rubber-tired transit systems with vehicles operating under a plan providing dynamic scheduling and routing and helicopters and V/STOL aircraft. But the real need is to embrace public acceptance of the automobile and work toward a system in which vehicles can operate under manual control on conventional streets and automatically, under electric power, on expressways. It now appears "relatively safe to predict," said Dean Seifert, "that, on a purely technical basis, an essentially fully automated, safe, fast transportation system which would effectively meet the needs of passenger transportation in the densely populated areas of the nation could be brought into being over a period of 10 to 20 years." But the investment required would be very large, he warned, and the first step is to devise forms of co-operation between industry and government which would make available the necessary financial support. And this development effort will have to be largely an act of faith, he said. "The final measure of public acceptance will be available only after a system is in being and people can use and appraise it."

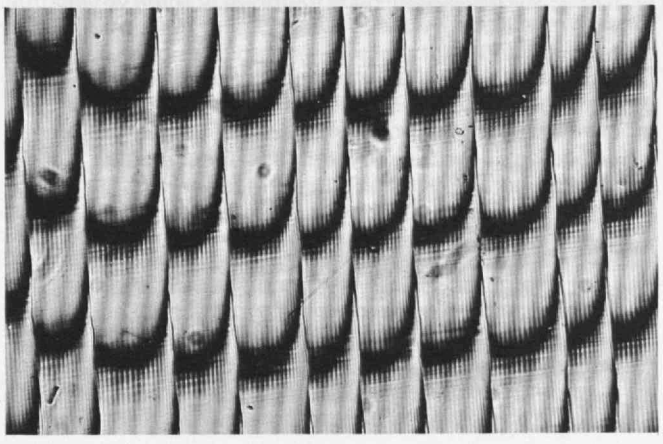
Deep Inside Crystals

The technology of growing single crystals of semiconductor material has long lagged behind the theory of such materials. Earlier this year M.I.T. researchers developed a method of studying crystal growth from the inside, by introducing bench marks into the growing crystal with a vibrator (*see* Technology Review, *Apr., 1967, p. 75);* however, this method gave only a limited view of the distributions of impurities in crystals (and the causes of such distributions). Now August F. Witt, Associate Professor of Metallurgy at M.I.T., has added great precision to the technique by capitalizing upon an electrical phenomenon known as the Peltier effect.

The Peltier effect is the absorption of heat at surface between two materials when an electric current is passed across the surface. In the case of a surface between a solid crystal and its liquid melt, passage of a current through the boundary as the cyrstal is being pulled from the melt causes impurities to form into bands in the crystal (*see photo below*). Such bands show very clearly the effect of the crystal's growth rate and other influences on the distribution of impurities in the crystal. The Peltier effect gives much more precision than vibrations, as the experimenter can control the shape and length of the electrical pulse very accurately.

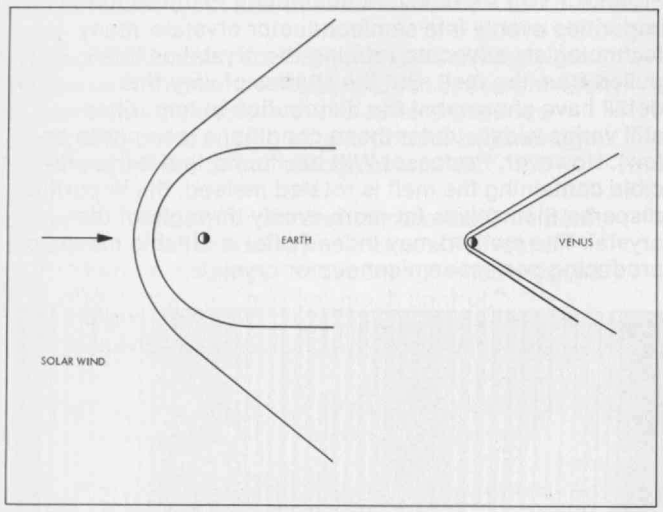
One important conclusion has already emerged from Professor Witt's studies. In attempting to introduce impurities evenly into semiconductor crystals, many technologists advocate rotating the crystal as it is pulled from the melt. But the studies of very fine detail have shown that the distribution of impurities still varies widely under these conditions (*see photo below*). However, Professor Witt has found that if the crucible containing the melt is rotated instead, the impurities disperse themselves far more evenly throughout the crystal. The method may indeed offer a reliable means of producing perfect semiconductor crystals.

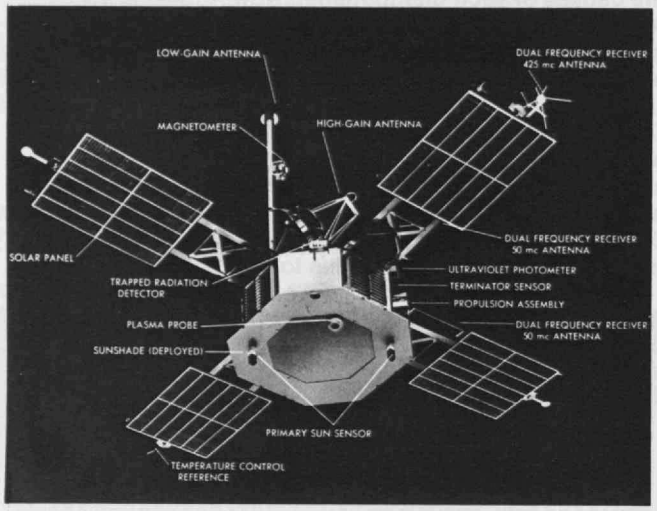




Distribution of impurities in semiconductor crystals varies largely even on the very small scale. The dark lines in the lower photograph indicate the amounts of impurities present in small sections of a crystal. Upper photograph shows the congregation of impurities (dark bands) after a series of electrical currents has been passed through a crystal as it is pulled from its melt, in experiments by August F. Witt. The large bands in the lower photograph correspond to the bands in the upper one, illustrating the wealth of fine detail that the method achieves.

Mariner 5 spacecraft flew by Venus last October, carrying among its hardware an M.I.T. plasma probe, shown mounted at the bottom of the craft. The probe, containing 1,300 electronic components and weighing 6.5 pounds, had the primary purpose of investigating whether Venus has a magnetosphere. The measurements disclosed that the effect of the magnetic field of Venus on the solar wind is much less than that of the earth's field, shown in sketch. This observation means either that Venus has a very small magnetic field, or that interaction occurs between its ionosphere and the solar wind.





Magnetism on Venus?

The Soviet and U.S., probes which respectively soft-landed on and flew by Venus within two days of each other in October cast at least a thin shaft of light on the mysteries of earth's nearest planetary neighbor. The temperature on the planet's surface, it appears, is a searing 536°F.; its atmosphere, composed mainly of carbon dioxide, is so dense that it causes bizarre optical effects—a hypothetical Venusian would obtain the impression that he lived at the bottom of a pit; Venus possesses no equivalent to the Van Allen belts of radiation that encircle the earth; and the planet's magnetic field, if it exists, is far weaker than the earth's.

This last result derived from a solar plasma experiment aboard *Mariner 5,* organized by an M.I.T. group led by Alan J. Lazarus, '53, Assistant Professor of Physics, and Herbert S. Bridge, Ph.D.'50, Associate Director of the Center for Space Research. Its results give scientists some indication of the interaction between Venus and the solar wind.

The solar wind is a stream of hot ionized gas, or plasma, which flows outward from the sun at supersonic speeds. When it encounters the earth's magnetic field, the wind flows around it, leaving a long tail behind the earth devoid of plasma. In fact two boundaries must be distinguished in the interaction of the solar wind with the earth's magnetic field (*see figure*). Along a line between the sun and the earth, the earth's magnetosphere ends at about 67,000 miles from the earth, the boundary being known as the magnetopause; 27,000 miles nearer to the sun exists a bow shock wave, analogous to the shock wave which forms around aircraft traveling at supersonic speeds. In the region between the magnetosphere and the shock wave the solar plasma is very turbulent, by contrast with its smooth flow in interplanetary space. This region is known as the magnetosheath.

The M.I.T. experiment aboard *Mariner 5* measured the density, speed and other properties of the solar plasma around Venus. The probe detected two boundaries in the plasma analogous to those of the earth's magnetosphere *(see figure).* The outer one is probably a bow shock wave equivalent to that around the earth, but the second boundary differs somewhat from the earth's magnetopause. Inside this boundary, the amount of plasma falls almost to zero.
The observations could be explained on the basis of two different models. The first possibility is that the solar plasma interacts with a small magnetic field of Venus. If this is the case the intrinsic magnetic field of Venus can be no larger than one three-hundredth of the earth's field. The second possibility is that the solar plasma interacts with the ionosphere of Venus. So far, scientists are unable to differentiate these two suggestions.

The data from Venus add to similar measurements of the effects of the solar wind on Mars and the moon. Paradoxically, measurements of this nature on other bodies in the solar system assist scientists in understanding the earth's magnetosphere.

Radio Dish Design

A broad look at the state of the radio telescope art in October left many American radio astronomers feeling that they were definitely number two. An international symposium on structures technology for large radio and radar telescope systems at M.I.T. highlighted two new European projects for large radio telescopes which have hurdled the barrier of obtaining the necessary funds. Current U.S. proposals for large telescopes, however attractive they appear to radio astronomers, seem to be frozen out of the budget.

The main event of the symposium was the announcement that the design for a 400-foot-diameter radio telescope, a companion for Jodrell Bank's 250-foot instrument, had been commissioned by the British Government. H. C. Husband, whose family firm has been awarded the contract, remarked that the government was almost certain to follow up the design by funding the telescope itself. The instrument should be completed by about 1971, at which time it will become the largest fully steerable radio telescope in the world.

A second European monster telescope now being built for the University of Bonn was described by O. Hachenberg of the Max-Planck-Institut-für-Radioastronomie; the 328-foot-diameter instrument is due to start scanning the skies in 1970. Dr. Hachenberg said the instrument would withstand winds up to 40 miles per hour without deformation, even though the antenna will not have the protection of a radome. The design team in fact concluded that a radome would prove too costly.

Strong support for the value of radomes came from members of the North East Radio Observatory Corporation whose proposal for a 440-foot radome-protected dish was temporarily shelved by a special National Science Foundation panel this summer (*see* Technology Review, *Nov., 1967, page 49).* Herbert G. Weiss, '40, argued that radio dishes designed by computer and protected from the climate by radomes offer radio astronomers facilities whose performances they can control completely; further, the cost of radome-enclosed instruments is far less than that of unprotected instruments with equivalent performance.

At the symposium banquet, delegates looked into their crystal balls at possible designs for future radio telescopes. Large (1,000-foot-diameter) steerable radio telescopes and radio antennas in space figured among the forecasts, as well as the more bizarre possibility of building static instruments of the Arecibo type into the large craters on the far side of the moon. In addition to the advantage of size—diameters of one to two miles—such telescopes would be completely free from man-made radio noise, at least for a few decades.

Saturn Success

The Apollo moon program, braked almost to a standstill last January by the launch-pad deaths of three astronauts, acquired fresh momentum in November with the successful maiden flight of the *Saturn 5* rocket. The flight achieved all its objectives: launch of the monster rocket which will loft Apollo astronauts towards the moon, restart of the rocket's third stage—a necessary step on the way to the moon—and safe return of the Apollo capsule to earth at 25,000 miles per hour, the speed at which it will return from the moon to splash-down on earth.

The Apollo command module was, of course, unmanned for this test flight. Throughout the flight it was controlled by a computer program known as SOLARIUM which was written and verified at M.I.T.'s Instrumentation Laboratory. This program, a very detailed sequence of instructions and a library of pertinent information, was permanently built into the flight guidance computer, itself designed at the Instrumentation Laboratory. The program is very basic to the guidance and navigation plan, as it controls the wiring sequence for the computer's memory.

Success of the guidance system can be judged by the accuracy of the splash-down: the capsule hit the Pacific within six miles of the *U.S.S. Bennington,* the prime recovery ship. In fact, analysis of the ship's movement just before splash-down may show even better performance by the guidance and navigation system: at present the exact position of the *Bennington* with respect to the target position at splash-down is not accurately known.

A Ball for the Blind

How can a blind child learn about the "dynamics" of things—how a ball bounces and rolls downhill, how blocks stand and fall? Not by the kinds of trial-and-error observations that most children use, unless—perhaps—he has a sound-source ball which he can "see" because of the sound it makes. Several such balls have now been designed and tested by Woodie C. Flowers, an M.I.T. graduate student, using preliminary studies by Ronald D. Rothchild, '63, in the Sensory Aids and Prostheses Program of the M.I.T. Engineering Projects Laboratory.

The design of an ideal sound-source ball is not so simple, after all. It must behave as a spherical sound source, emitting sound from every point on its surface, and it must do so continuously; so a blind child playing with it has no sense of a "shape" other than spherical and so he can find it without help. Its center and center of gravity must correspond, so it will behave consistently when bounced or thrown. It must be light and easy for young children to handle. It must be soft, like a basketball, so that it cannot cause injuries; and it must endure being bounced, kicked, batted, and otherwise abused.

One design, tried and rejected as too expensive and not "bouncy" enough, used a sphere of polyurethane foam with a "Sonalert" pulsed sound source embedded in a piano-wire cage in the center, the whole covered by a skin of plastic-coated nylon as used for foul-weather apparel. Another more successful design involved two essentially conventional inflatable balls with several small sound sources distributed on the outside of the inner ball. Appropriate inflation of the two balls to different pressures led to a result which passed the test of use and abuse at the Perkins School for the Blind in Watertown, Mass. But the sound source was not loud enough, for children could not hear the ball coming soon enough to respond effectively.

Miracle of Speech

All man's efforts to understand his "phenomenal" ability to produce and perceive speech have served only to reveal how far he has to go to catch up with himself.

Fundamental problems of the processes of speech and hearing were cited repeatedly as the areas commanding the attention of today's speech communications experts when about 750 of them attended the 1967 Conference on Speech Communication and Processing at M.I.T. in November. The conference was sponsored jointly by the Air Force Cambridge Research Laboratories and the I.E.E.E. Audio and Electroacoustics Group.

At the session of broadest interest, seven conference members formed a panel to speculate on tomorrow's research problems and activities. All of them emphasized the need for basic studies on a far wider scale than are now programmed.

Speech research is now at a kind of turning point in its history, said M. R. Schroeder of Bell Telephone Laboratories, Inc. The traditional goal of speech studies has been to reduce the redundancy of human speech so that it could be transmitted over narrower and narrower communications channels. But now communications channels are relatively unlimited, the vocoder is ready for the museum, and a computerized society has different needs and new tools. Digital computers can be used to analyze and to simulate speech, and novel methods for examining the speech production process are on the horizon, including ultrasonic techniques and even acoustic holography. And new multidimensional scaling techniques from mathematical research make possible reduction of complex data, such as speech forms, to reveal the key variables.

Kenneth N. Stevens, Sc.D.'52, Professor of Electrical Engineering at M.I.T., stressed questions about the biological mechanisms of speech production and perception. Research in the electrophysiology of hearing now utilizes rather simple sounds as stimuli; but as this research evolves and as knowledge of the nature of speech improves, we should soon be able to learn more fully how the auditory system responds to the complex sounds of speech.

And finally, said Professor Stevens, there is the question of how contextual, semantic information associated with speech actually contributes to speech perception itself.

"Speech is a very special process," said Franklin S. Cooper, Ph.D.'36, President of Haskins Laboratories, Inc. "It is not to be understood as a simple psychoacoustic phenomenon. We tend in our research to assume that all speech is standardized," he said, "but intuitively we know it is not." The physiological differences to which he referred, he said, are probably very large and may be of special importance to our future understanding.

If speech reproduction is our goal, said Dr. Cooper, we are unlikely to progress toward it until we know much more about the human's prodigious feat of conversational speech.

A New Urban Man

The urban crisis is not housing, jobs, schools, transportation, nor even all of these. It is the complex of America's adjustment from a way of life which is basically rural to a new kind of life style which capitalizes on the unique qualities of the modern city. The new urban man will not be afraid of his environment; he will be eager to find in its diversity a larger life space than he has ever had before and new kinds of people to whom he has never before related.

This is the view of Noel Day, a consulting urban sociologist and partner in the Organization for Social and Technical innovation, who spoke late this fall at the Seminar on Technology and Culture at M.I.T. organized by the Reverend Myron B. Bloy, Jr., Religious Counselor.

The rural child who has never seen a Chinese man is just as deprived as the city child who has never seen a forest.

Our need today is to enhance the life style of all those who are underprivileged in ways such as these, to find a way of distributing more equably life's many experiences, to give all humans a share of self-respect, to find a new role for the family under conditions when work and home are separated.

This is a crisis, said Mr. Day, because it is a moment of decision. The preconditions exist for tearing ourselves apart," he told the Seminar, "or we can soar upwards toward the real potentials of urban life." Today's urban riots are a symptom of uncertainty; they are devoid of ideological content. If we default, said Mr. Day, the sniper in today's riots, who is "out for kicks," will be replaced by a determined man and a systematic assault on an unrenewed public system for which we know but cannot organize the remedies.

Airports Retarded?

Improvements in navigation and control which would materially increase the efficiency of the multiple airport systems serving the larger metropolitan areas are within the current "state-of-the-art" in electronics and data processing, and the new generation of large jet aircraft is "finally developing a force to rehabilitate air traffic control," Robert J. Shank, Vice President of Airborne Instrument Laboratories, has told an M.I.T. air transportation seminar.

Mr. Shank assumes that present trends in air traffic control systems will continue until they have provided a complete surveillance system where the position and identity of all aircraft are made available automatically. This is the logical development of the primary and secondary radar program which followed World War II. This data base will provide the necessary input for traffic control by present "essentially manual techniques" based upon cathode-ray tube position displays, Mr. Shank said, and will also permit the subsequent application of data-processing techniques to conflict prediction, conflict resolution, flow control, and cueing.

Mr. Shank thinks this present trend is the correct first step toward automation, but that it suffers from four basic deficiencies, which must ultimately be corrected:

1. Present techniques are based upon two separate control loops, one involving the pilot and the other the ground controller, which utilize separate data and are without automatic intercommunication. The data systems should be consolidated, and the pilot and ground controller should each have a better view of the information that is before the other.
2. The present system is basically human-operated. But "men have a very distinct limit on what they can do," and when a human saturates, his efficiency goes down sharply. Most men, too, think in only two dimensions, and their aircraft flight-control data come to them this way; but the problem is clearly three-dimensional. New data-processing and decision-making techniques are needed.
3. The two necessary functions of navigation and control are performed by two independent systems which, while they provide some redundancy, do not readily cross-check. Both higher accuracy and rigorous cross-checking will be required to utilize fully the airspace above the high-density metropolitan areas. A single high-accuracy system would have some advantages provided it had enough internal redundancy to be fail-proof, Mr. Shank believes.
4. Today's instrument-landing system is a single-path system, which constrains all aircraft to use the same approach path despite their differing landing speeds and approach angles. A more flexible alternative, growing out of precision approach radars, would use scanning beams to replace today's fixed paths and so provide a family of routes.

Present navigation devices are simply not accurate enough to permit high-density flight patterns, Mr. Shank says. Simultaneous landings cannot now be made on parallel runways less than a mile apart, and in this country such instrumented runways are available only at O'Hare Airport in Chicago and Dulles Airport at Washington, D. C. But Mr. Shank insists that modern technology fully utilized would make possible half-mile separations and simultaneous use of runways at many other major airports.

Our problems will increase, he says, until we provide the required positioning accuracy and are willing to put ground and air information into computers which can automatically generate the control signals for which we now depend on human senses and two-dimensional displays.

Bias in Transit

A transportation plan is more than a study of transportation, and it is the human—not the technological—problems that breed the planner's dilemmas.

Though they are by no means simple, surveys of current transportation demand are now relatively routine. The problems arise when planners must estimate where people and jobs will be 5, 10, and 20 years hence, what will be the effect of various transportation alternatives on these predictions, and what is a reasonable economic value to assign to a transportation system. To reach these conclusions, George Wickstrom, Assistant Technical Director of the Transportation Planning Board of the Metropolitan Washington Council of Governments, told an M.I.T. seminar late in the fall, today's transportation planners must consider "the whole range of urban activities."

Among relevant factors he listed existing and desired future land uses, trends in the population and its employment, water and sewer plans and policies, personal incomes, and such value judgments as the importance of noise and air pollution. Data collection and analysis must be continuous. Although most transportation surveys are designed to yield long-range plans, Mr. Wickstrom said, "the ideal end-state plan is not the one that needs study." The problem is to develop adequate partial plans and incremental transportation systems, because progress cannot be postponed and it will be many years, if ever, before the full "ideal" systems are realized. And it is also important, he warned, to be sure long-range predictions incorporate the effects of these interim decisions.

At the moment, he said, economic factors seem to suggest that a 20-m.p.h. system is optimum in the core city. Faster systems are too costly. As costs go up, this optimum speed figure goes down. At some point it could be so low that the core city concept can become untenable.

Mr. Wickstrom said that a limitation of most transportation surveys is dealing only with peak-hour commuting travel. Weekend and tourist travel, he said, are significant factors.

A limitation of many transportation programs is that they produce "middle class" plans; they deal solely with problems of moving large numbers of people from suburbs to the city. Transportation planning programs should not deal only with mass behavior, but must now start to tailor solutions to specific problems of individual groups.

Institute Review

$3 Million for Urban Studies

M.I.T.'s plans for building "a new bridge to the world of action" in the field of urban problems began to move from blueprint to fact late in November with a $3 million grant from the Ford Foundation. The funds will be used by the Institute for professorships in urban affairs, an interdepartmental laboratory for urban systems analysis, a program of M.I.T. Fellows in Urban Affairs, lectureships, and other activities —in all, broader participation than ever before by students and faculty at the Institute in the study of urban problems.

The plans were announced by Howard W. Johnson, President of M.I.T., at a joint press conference with Nathan M. Pusey, President of Harvard University, which received a similar $3 million Ford grant, and Daniel P. Moynihan, Director of the two institutions' Joint Center for Urban Studies. It was the Joint Center, Professor Moynihan said, that "took the initiative in conceiving the programs and positions that the Ford grant will make possible."

Discussion at the press conference served to emphasize the basic character of the urban research being planned under the Ford grant. One interviewer bluntly asked, "Does the academic world have answers to the problem of the ghetto?" James Q. Wilson of the Harvard faculty replied by noting that on any important political issue academic people in general are as sharply divided as other groups in the population. Their contribution can be to demonstrate possible alternatives, indicate the likely consequences of action, and to improve "the quality of debate" on public issues. "Able people are scarce," he said, "and the new grant enables us to build up over the long term a cadre of qualified teachers and workers." The university's role, said Professor Moynihan, is not to make poltitical decisions but to "provide the political community with options it doesn't know it has." What will happen to the city in the meantime? Professor Moynihan had only this to say: when you have funds for cancer research, you do not distribute them to help cancer patients meet their hospital bills.

This controversy was continued later when the Grove Hall Community Development Corporation, a federation of self-help agencies in Boston's Negro community, decided to boycott research and planning projects of the Joint Center. "Armchair theoreticians and uninvolved intellectuals are a pure waste of money," the statement said.

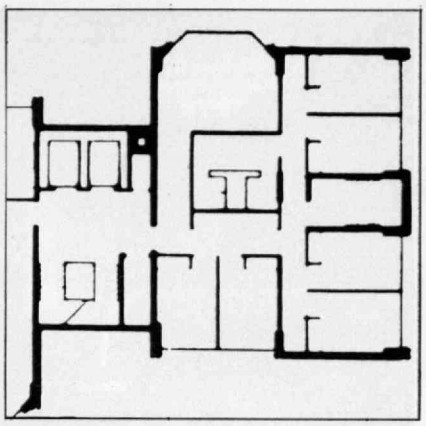
The urban systems laboratory, included in M.I.T.'s plans under the Ford grant, will serve to intergrate the many disciplines involved in studying the complex, dynamic variables in urban design, construction, and services. M.I.T.'s new Fellows in Urban Affairs will work on the staffs of urban officials for periods of a year or more following their graduation from M.I.T. The appointment of Mayor John F. Collins of Boston to the M.I.T. faculty at the expiration of his service in City Hall this month was cited as an example of the new teaching skills which the Ford grant will bring to M.I.T.

The most important consequence of the Harvard-M.I.T. grants, Professor Wilson said, "will be to give students an interest and knowledgable commitment to the problems of the cities." They will "raise the level of urban studies at the two universities to a dimension that has never before existed and which was only recently envisioned," said Professor Moynihan.

The grants to Harvard and M.I.T. were part of a $10.8 million Ford Foundation program for the establishment of new professorships and research activities on the problems of American cities; other institutions involved were Columbia University ($1.8 million) and the University of Chicago ($3 million).

"Eight years ago urban studies as such hardly existed in Cambridge; today they have become a major focus of academic activity," said Daniel P. Moynihan (center), Director of the Joint Center for Urban Studies, at the news conference at which Harvard and M.I.T. each announced new $3 million grants from the Ford Foundation for work on the problems of American cities. Professor Moynihan was flanked by Presidents Nathan M. Pusey of Harvard (left), Howard W. Johnson of M.I.T. (right) and Thomas D. Cabot (far right), Chairman of the Joint Center's Visiting Committee, an Overseer of Harvard, and a Life Member of the M.I.T. Corporation.

The architects' program for MacGregor House calls for individual bedroom-study units for each student, because "students at M.I.T. are intensively engaged in studies and research which do not always follow a pattern set by calendar or clock." A living room associated with four to eight bedroom-study units (six in the sample plan at the right) will give "physical form and identity" to the social group; each living room will include Pullman-type sink-hotplate-refrigerator units and storage for card table and folding chairs.



Residential Research

When construction finally began on the newest Institute house, MacGregor House may have been the most-researched student residence ever built on a U.S. campus. It marked the long-delayed beginning of a program to improve a residential system which Dean Kenneth R. Wadleigh, '43, has called "woefully inadequate." The program, he said this fall in a special statement to M.I.T. alumni, is the "most pressing need we see in the area of student environment."

The architects for MacGregor House, the Architects Collaborative of Cambridge associated with Pietro Belluschi, Dean Emeritus of M.I.T.'s School of Architecture and Planning, were given a seven-point outline on the basis of which to plan the building. But the outline was established "not as a map for the entire journey but as a base of departure for the architects' experience, talent, and skills," says the M.I.T. Planning Office. The seven basic considerations for the building were:

1. "The overwhelming majority" of M.I.T. students give first priority to privacy, so the building should contain single study-sleeping rooms—but arranged so that they may be reorganized by students who choose to live together.

2. Students living alone need close contact with small and larger groups of their colleagues. Thus the single rooms should be organized into suites with such common living facilities as lounge, small kitchen, and bath. And groups of these suites, in turn, should have a focus for meeting and entertaining in larger groups.

3. The economies of scale, dictating dining service for at least 500 students from a single kitchen, balance against the personal disadvantages of living in large institutional units. MacGregor House is therefore planned for about 325 men, and a kitchen to be added later will be large enough to serve both MacGregor and another similar house planned for construction as soon as funding becomes available.

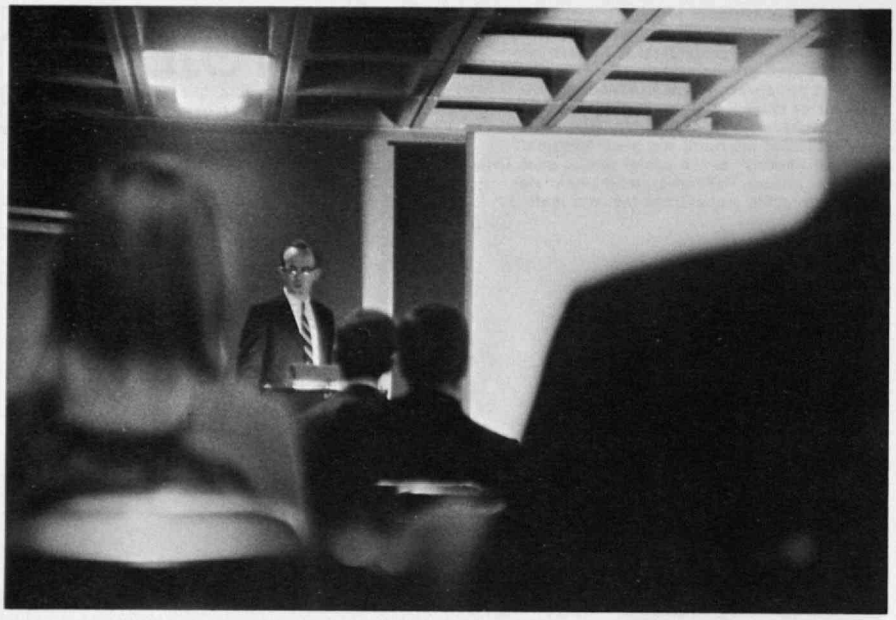
4. The dining room offers special possibilities for achieving the purposes of undergraduate residence, for meals more than most other occasions "can be profitably utilized for the exchange of ideas among students and between students and their elders," in the words of the 1956 Committee on Student Housing. So MacGregor's dining room is to emphasize "the control of noise and clatter so characteristic of institutional dining rooms," and at the same time it is to be a multi-purpose room for use as a ballroom or small theater.

5. The library is an integral part of the plan, not in order to substitute for Institute libraries but to provide a convenient impetus for MacGregor House residents to learn the role of a library in all kinds of study and recreational situations.

6. House facilities are to supplement, rather than compete with, the Student Center which is designed for wider use by the entire community. Accordingly, the MacGregor House plans include a common room for residents and guests; laundry for the use of residents; activity areas to be developed according to the residents' interests into darkroom, woodworking shop, art studio, music practice room, etc.; exercise room and squash courts, game room, and two seminar rooms.

7. The program of housemaster and tutors living in each undergraduate residence "has had immeasurable influence on the quality of residential life" since its establishment in 1951, Dean Wadleigh wrote to the alumni. Accordingly, MacGregor House provides a family residence for the housemaster, a smaller family residence for a senior tutor, and one apartment for a graduate-student tutor in each entry.

Construction of MacGregor House is made possible by a $2 million gift from Frank S. MacGregor, '07, announced late in 1965, and by government-loan financing. Its planning has been a co-operative project involving studies of the Committee on Student Environment (1963), and the continuing faculty and student committees on housing and on the M.I.T. environment.



Arnold E. Amstutz, '58, Associate Professor of Management at M.I.T., had this advice for students attending the New England meeting of college union managing committees at the Institute this fall: "Imposing our own set of importance measures gets in our way more than anything else" in communicating with others.

New Group for Dynamics

Thanks to M.I.T., the principles of problem-finding, group dynamics, decision-making, and advertising have come to a new enterprise: the management of college social facilities.

Though the Junior Prom and Field Day provided ample distractions, more than 300 delegates from throughout New England spent a three-day weekend in November with Operation Springboard, the annual meeting of the New England Region of Associated College Unions International, in the Julius Adams Stratton Building at M.I.T. If it succeeded, the meeting, said Jack B. Rector, Jr., '68, chairman of the conference (and also of the M.I.T. Student Center Committee for 1967-1968), would send each of them back to his school "aware of the basic reasons for success or failure of human organization," the subtleties of working with people and groups.

At the opening session in the Student Center, Mr. Rector dedicated the conference to "a man who was this building," the late James N. Murphy. He described the building as an outstanding example of the success of student, faculty, and alumni planning.

Graduates in Jeopardy?

Two federal actions now threaten severe handicaps for U.S. graduate education next year, and M.I.T.'s position in relation to them remains unclear. Funds for graduate fellowships under the National Defense Education Act have been cut by 40 per cent, and new regulations will make most graduate students eligible for the draft at the end of the current year.

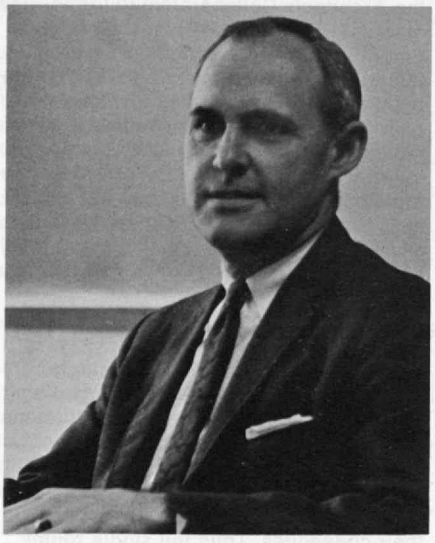
Under the new Selective Service rules, virtually all seniors who graduate next June, as well as graduate students who complete their first year or receive degrees, will be reclassified for induction. Unless the rules are changed, says the American Council on Education, the result will be that "enrollment in the first two years of graduate and professional schools next fall will be limited to women, veterans, men physically disqualified, and those over age 25."

The regulations apply to all graduate students except those in certain fields of special national interest—defined so far only as medicine, dentistry, veterinary medicine, osteopathy, and optometry. Authorities at M.I.T. expect that some additional fields—almost surely including engineering and the physical sciences—will be added to the critical list. But no one is sure of the status of students in such fields as linguistics, pyschology, metallurgy, the life sciences, and the related social sciences—economics, political science, and management.

Such questions "very badly need clarification," according to Irwin W. Sizer, Dean of the Graduate School, for there is no certainty now how many students at M.I.T. will be affected.

The question also remains, he noted, as to how individual draft boards will tap the new pool of potential inductees if in fact Selective Service regulations remain unchanged. The rules now provide that the oldest candidates, up to the limit of age 26, be tapped first. If applied to graduate students, this would have the effect of taking those who are nearest to completing their degrees.

The new regulations have brought vigorous protest from U.S. campuses. They "will have immediate serious consequences for graduation education and will produce an inevitable deterioration of all higher education for an unpredictable number of years," the Council of Graduate Schools in the U.S. has written to President Lyndon B. Johnson. As an alternative, the Council has proposed a policy of making all students eligible for the draft but only at intervals of transition—between high school and college, immediately after receiving the bachelor's degree, or upon completion of advanced work. Under this random-selection proposal, no fields would be exempted.



Charles A. Myers

Sloan Fellows Professor

Charles A. Myers has been named Sloan Fellows Professor of Management in the Alfred P. Sloan School of Management, a chair established in 1962 by the Society of Sloan Fellows, graduates of M.I.T.'s one-year Sloan Fellows Program of executive development for middle managers.

A labor economist, Professor Myers came to M.I.T. in 1939 and has been Director of the Industrial Relations Section since 1948 and Professor of Industrial Relations since 1949. He is well known as a consultant and arbitrator, and he has written many books and articles on management, personnel relations, and industrial uses of computers.

The Fowle Trophy for the New England Team Racing Championship came to M.I.T. this fall at the end of a two-day meet on the Charles. The Tech sailors' hardest race was a 4-2 victory over the Coast Guard Academy, perennial rivals, in the semi-finals; the score was 4-0 over the University of Rhode Island in the finals. (Photo: Li-Shiang Liang, '70)

Strategic Success

After a weekend of split-second maneuvers on the Charles, M.I.T.'s sailing team emerged as New England Champions late in November. One reason was their success with strategy, of which one instance in the second race was described by *The Tech*: Robert L. Berliner, '70, in fourth place approaching the finish, saw Coast Guard boats ready to win in positions 1, 3, 5, and 7. So he turned back, "forced the fifth-place boat away from the finish line and lured the seventh-place boat after him . . . succeeded in both disqualifying one opponent and letting each Tech boat advance two places . . . giving Tech a ¼-point victory in the race."

Innovation and Freedom

Massachusetts has a special attraction for college teachers.

The Woodrow Wilson Foundation, which annually sponsors fellowships for many graduate students who hope eventually to teach, finds that over 9 per cent of its former fellows have settled in college teaching jobs in Massachusetts, 12 per cent in California, and 11.4 per cent in New York. The Bay State's share of these prestige teachers is remarkable because only 5 percent of all U.S. college teachers are employed here, the Boston *Globe* pointed out in covering the story.

The fellows chose their favorite locations because they offered positive intellectual climates and because of a feeling that teachers' efforts could really count there. The most attractive characteristics of a college faculty, according to Hans Rosenhaupt, the Director of the Foundation, seem to be the school's involvement in innovation, its assurance of intellectual freedom, its recognition that teaching is as important as publication, and its appreciation of students as people who matter.

According to the Foundation, 39 former fellows are teaching at M.I.T. compared with 86 at Harvard, the second and first institutions in the state, respectively.

International Biology

A two-year $64,700 grant from the National Science Foundation to M.I.T. will make possible an international exchange in molecular biology research.

Selected scientists, students and technicians from the molecular biology laboratory of Paul R. Gross, Professor of Biology at M.I.T., will spend up to a year at the Institute of Comparative Anatomy at the University of Palermo, Italy. Personnel from the Palermo Institute, which is headed by Professor Alberto Monroy, one of the world's authorities on developmental anatomy, will spend similar periods at M.I.T. The Italian government will support Palermo's part in the exchange, which is one of the first under a new agreement for fostering co-operation between workers in the two countries.

The M.I.T. group has focused attention on biochemical processes inside the living cell that determine its development and differentiation; the Palermo institution has given special attention to cell fertilization and early cell development. So the two groups' work is complementary, and the National Science Foundation funds will strengthen an informal collaboration which has developed in recent years.

Renewing the Highway Debate

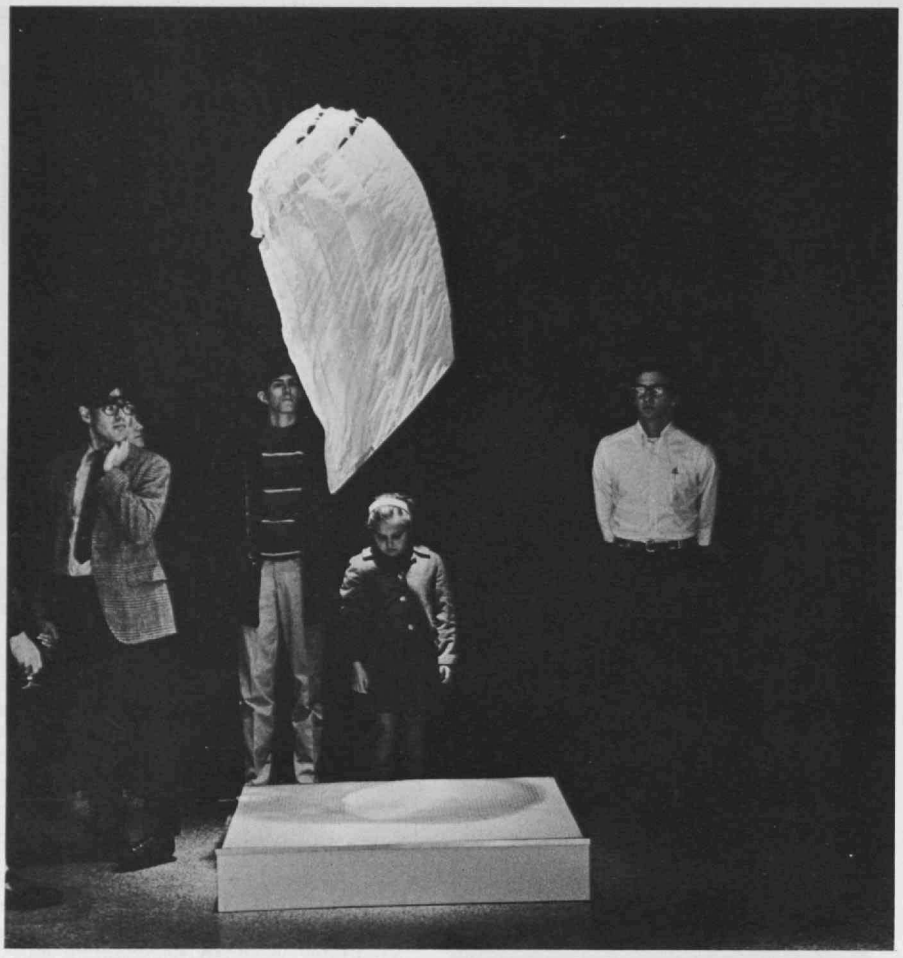
The great debate about where to put the "Inner Belt" highway through Cambridge has not ended after all (*see* Technology Review, *July, 1967, p. 60*). Indeed, it may be starting all over again. Two routes for the limited-access highway between Somerville and the Brighton section of Boston have long been in contention—across Central Square along Brookline and Elm Streets, and just behind the M.I.T. campus, parallel with Albany Street and the New York Central Railroad "grand junction" line. Now the waters have been muddied by the disinterment of a third proposal—to use the route of Memorial Drive through Cambridge; by the award to Cambridge of a federal "model cities" planning grant for study of part of the area involved in the Brookline-Elm Street route; by an outspoken statement of Cardinal Cushing at the 100th anniversary of St. Mary's Church in Cambridge: "I take this occasion to honor publicly those of you who have fought this road. I support all people of Cambridge opposed to this Inner Belt which will dislocate some 1200 families, drastically change this city, and close its churches and schools."

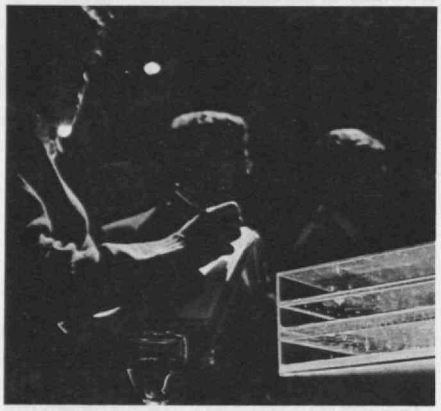
General Foods Professorship

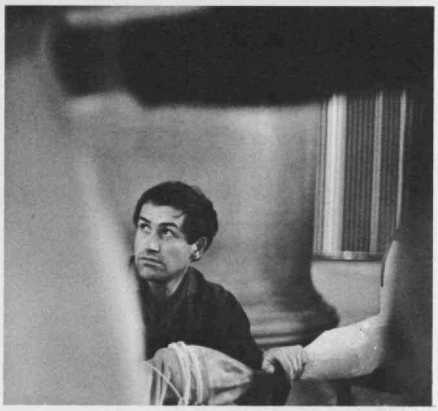
Continued support of the General Foods Professorship in the M.I.T. Department of Nutrition and Food Science has been provided by a $25,000 grant-in-aid of the General Foods Fund, Inc.
The professorship is currently held by Hamish N. Munro, who came to the Institute in 1966 from the University of Glasgow. He is a physiological chemist working on nutritional and hormonal factors affecting protein metabolism.

41-for-Freedom

A Navy "Forty One For Freedom" award has been made to M.I.T.'s Instrumentation Laboratory for the Laboratory's design and development of guidance systems for the POLARIS/POSEIDON Fleet Ballistic Missile System. The name of the award refers to the 41 nuclear-powered submarines that make up the POLARIS launching fleet.







"Articulate Something Natural"

A new kind of "kinetic art" came to M.I.T. this winter with a collection of works by Hans Haacke which was more like a "happening" than an exhibition. The theory, wrote the German-born artist, is to "make something which reacts to its environment, changes, is non-stable, which lives in time and makes the 'spectator' experience time. Articulate something natural," he said.

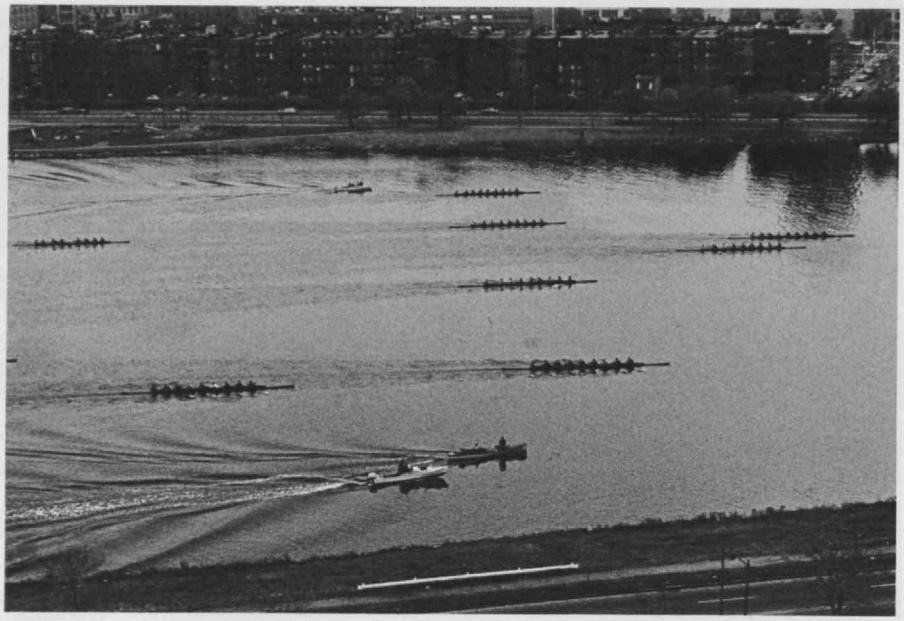
The exhibit opened with a launching of several hundred helium-filled balloons on a nylon string from the roof of the Student Center. It dismayed the artist not at all that they were buffeted by a small gale and that many broke free; "make something which cannot 'perform' without the assistance of its environment," he has said. Elsewhere in the Institute, a large weather balloon was launched in the lobby of the Rogers Building, and various works with ingredients such as earth and grass seed, plastic boxes, condensing moisture, and air currents were on exhibition in the Hayden Gallery.

"That these things are in an art gallery and not a laboratory has its significance for the viewer," wrote Christopher Andreae in *The Christian Science Monitor*. "He is inclined to inspect them as objects to be appraised aesthetically, and the manner in which he can view objects in a gallery is enlarged." Indeed, said Mr. Andreae, "Mr. Haacke's works are closer to an art of landscape than almost any significant artist has come for at least a decade or so." The photographs on these pages show some of the exhibited works and some of the enthusiasm with which they were greeted by members of the M.I.T. community. Above: a "weather cube" with condensation patterns and a great fluttering nylon sheet; a wind-blown "stocking" held like a stationary parachute; a free-form ribbon moving in an air jet; a plastic sandwich with condensing water; a frosted, lighted plexiglas tube; and the artist himself confronting the realities of the physical world while trying to inflate his giant balloon in the Rogers Lobby. (Photos: Owen D. Franken, '68, and Arthur A. Kalotkin, '68.)

Class Day: Ice Before Crabs

Despite a week of wind, rough water and ice, Class Day ended the fall crew season of 1967 on November 11 with more M.I.T. rowers on the Charles River than ever before in history. There were preliminary heats all morning and a full race schedule in the afternoon, pitting heavyweight and lightweight crews from each class against alumni boats, coxswains against co-eds, and many living groups against their colleagues. By the end of the day, everyone was ready for the long and (to crew enthusiasts) tedious winter season.

The day's closest contest was between the lightweight boats, when the seniors, juniors, and alumni traded the lead among themselves before the juniors finally took over with a strong sprint to win by a half-length over the alumni crew. The lightweight freshmen pulled an upset to win over the heavyweights, and the co-eds pulled ahead of the coxswains in a quarter-mile contest "marked by low strokes, many crabs, and a wealth of crude comments from the sidelines," said Harry Drab, '69, in *The Tech.* (Photo: Owen D. Franken,'68)



M.I.T. to the Moon

Russell L. Schweickart, '56, and Lt. Colonel David R. Scott, E.A.A. '62, will make it two out of three for M.I.T. on the first manned Saturn 5 flight. They will serve under the command of Lt. Colonel James A. McDivitt on the test of the Apollo command craft, service section, and moon-landing lunar module now scheduled by N.A.S.A. for late in 1968. The support crew for the flight will include Commander Edgar D. Mitchell, Sc.D.'64, and Lt. Colonel Edwin E. Aldrin, Jr., Sc.D.'63, is a member of the back-up crew for the second manned Apollo mission.

In reporting the Manned Spacecraft Center's choice, United Press pointed out that the first test crews from previous N.A.S.A. series have later been chosen for the first full mission in the series, hinting that Messrs. Scott and Schweickart could be on the first American team to attempt a moon landing.

M.I.T. Associates

David H. Robbins, '54, now serves as Director of the M.I.T. Associates Office, succeeding Thomas Yonker, '56, who has taken a position in industry.

In the new post, Mr. Robbins administers the Institute's relationships with a selected group of business and industrial firms—most of them from New England—with specialized interests in research and education.

Mr. Robbins has been associated with the M.I.T. Industrial Liaison Office since 1965 and previously was with I.B.M. Corporation's Boston operations.

No Blank Blackboard

Jerome Y. Lettvin's ('47) topic in his popular science lectures for over 500 high school students this fall was "Protective Coloration: An Old-Fashioned Biological Problem." But the students who heard him came away convinced that there is nothing old-fashioned about Professor Lettvin's approach to it.

Dr. Lettvin, Professor of Communications Physiology in the Departments of Biology and Electrical Engineering, described protective coloration as a tool for better understanding of complex physiological problems. A moth wing is green and leafshaped, and this is typical protective coloration. But it also has a pattern of "veins" that makes it look to us like a leaf; from this, Professor Lettvin said, we can learn that birds, from whom the moth is protecting itself, see not only shape and color but pattern as well. A spider spins a web which looks like a bird dropping on a leaf. Is this to attract his insect food? No, Professor Lettvin said, it is to discourage birds from hunting for the spider.

When a squid emits his black fluid, the fluid typically takes the shape of the squid in the water; meanwhile, the squid himself has turned from black to white and slipped away, and even unenlightened humans are unable to follow the action. "To this extent," said Professor Lettvin, "we may judge that the squid's predator is like us."

"When you begin to deal with ecology, you begin to realize that the notion of pattern is built into every animal. We are not born like a blank blackboard," said Professor Lettvin. "We have a built-in set of notions of what constitutes a pattern, the forms of things," and we share this "community of mind ideas" with animals. Can our knowledge of pattern-perception in animals help us to understand how humans see?

The 1209th R & D Group

More than 50 U.S. Army Reserve officers have found in the M.I.T.-based 1209th Research and Development Group a fruitful way of keeping up to date on technological developments while fulfilling their Army Reserve commitments. Now qualified members of the M.I.T. community, including alumni in the Greater Boston area, have been invited to join by Dennis M. Scolamiero of the M.I.T. Instrumentation Laboratory. Topics for lectures at regular Thursday meetings of the Group have included fluid interaction control devices, high-altitude surveillance, air traffic control problems, and advances in optical theory; a two-week active-duty research and development seminar is being planned for the summer of 1968 in Cambridge.

1968 Compton Lectures

Herbert A. Simon, Associate Dean of the Graduate School of Industrial Administration and Professor of Administration and Psychology at the Carnegie-Mellon University, will deliver the Karl Taylor Compton Lectures at M.I.T. on March 15, 18, and 20 at M.I.T. His topic will be "The Sciences of the Artificial," based on his current research interests in artificial intelligence and the interface between computer science and psychology.

Howard W. Johnson, President of M.I.T., in announcing the lectures, characterized Professor Simon as "a distinguished social scientist whose contributions have bridged the fields of political science, computer science, economics, psychology, and management." He studied at the University of Chicago and taught at Illinois Institute of Technology before going to Pittsburgh in 1949, and he has given distinguished lecture series at both Princeton and Harvard Universities.

Prospects: Medium

As the season began, prospects for winning winter sports teams at M.I.T. were bearish. No one thought the varsity basketball team could equal last year's record 19-win season, but Captain David G. Jansson, '68, seemed a sure bet to become the all-time M.I.T. basketball scorer during the season. Five lettermen were back for wrestling, but David Schramm, '67, two-time New England heavyweight champion, will be missed. And the hockey team's strength seemed "unchanged" after last year's 4-13 record.

The January varsity schedules include:

In Greater Boston: on January 6: basketball vs. Bates at M.I.T., hockey vs. Worcester Polytechnic at M.I.T., and wrestling vs. Coast Guard at M.I.T; on January 8: basketball at Northeastern; on January 10: wrestling at Harvard; on January 12: hockey vs. Ithaca at M.I.T.; and on January 13: hockey vs. the University of Connecticut at M.I.T.

At Middlebury: basketball on January 12.

At Norwich: basketball on January 13.

At Wesleyan: wrestling on January 13.

Mauzé Professor

Mildred S. Dresselhaus, a solid-state physicist at the Lincoln Laboratory since 1960 who has made outstanding contributions in the areas of superconductivity, band structure of solids, and magneto-optical properties of metals, has been named Abby Rockefeller Mauzé Visiting Professor at M.I.T.

Dr. Dresselhaus spent the fall semester in the Department of Electrical Engineering, lecturing, teaching, and participating in research. In addition, she met informally throughout the term with the women students at M.I.T.

Dr. Dresselhaus studied at Hunter College, the University of Cambridge, Radcliffe College, and the University of Chicago. She came to Lincoln Laboratory after two years at Cornell University as a National Science Foundation Fellow.

The Mauzé Professorship was established in 1963 to bring to the M.I.T. campus distinguished women scholars.

The ATO in Sheraton

A year and three days late, the Halloween blackout originally planned for 1966 was finally accomplished on November 3, 1967. The victim was the Sheraton-Boston Hotel, and the victors (over high winds and tight security) were five members of (what else?) Alpha Tau Omega fraternity. (Photo: Larry-Stuart Deutsch, '67, from *The Tech*)

Publications Honors

Special honors to 1966-1967 publications from M.I.T. and its Alumni Association received during the summer have consolidated the Institute's position of leadership in this field.

For the third consecutive year, the publications program administered by the M.I.T. Office of Publications was given the highest exceptional achievement award (including a $500 prize) in the annual competition of the American College Public Relations Association.

Technology Review placed among the 10 best alumni magazines in the 1967 judging of college and university magazines by the American Alumni Council, the first time in many years that the judges' panel picked the *Review* for this honor. In addition, both Office of Publications activities and *Technology Review* received other citations in the competitions.

Cartwright Appointment

Richard A. Cartwright, a distinguished philosopher who has made important original studies in the philosophy of logic, language, and mathematics, is now Professor of Philosophy in the M.I.T. Department of Humanities.

Dr. Cartwright came to M.I.T. this fall from Wayne State University, where he had been a member of the faculty since 1961. He studied at Oberlin College and Brown University (Ph.D., 1954), taught at the University of Michigan, and has been visiting professor or lecturer at Dartmouth College, Harvard University, and the University of California (Berkeley). Dr. Cartwright is the author of articles on ontology and the theory of meaning, abstract entities, and negative existentials, according to Robert L. Bishop, Dean of the M.I.T. School of Humanities and Social Science, who announced the appointment.

Anticlimactic Inhabitant

College room decor has taken a psychedelic twist. Barry M. Mitnick, '68, writing in *The Tech,* finds Baker House as "deranged on the inside as it is meandering on the outside." One room is described in detail:

"The so-called coffin single, a type of room so named for its shape, size, and embalming atmosphere, is here enlivened by: a multi-hued stuffed artificial parrot, swinging from the ceiling; orange, green, and gold burlap hung with white foam balls from the non-returnable 5.01 lab kit, a Selective Service Student Certificate and assorted *Time* Magazine covers; purple plastic grapes; packing cord dangling randomly; slabs of orange, blue, green and red oaktag; a button with the slogan, 'Reality is a Crutch'; a barber-pole striped radiator pipe; the black-and white Sophia Loren wall-hang with a New York *Times* Magazine cover of Lady Bird Johnson affixed over Miss Loren's face; and, anticlimactically, the room's inhabitant."

Being Up to Date

Two M.I.T. alumni are among 16 engineers and applied scientists who have returned to the classroom as Fellows of the Advanced Study Program of the M.I.T. Center for advanced Engineering Study this year.

The two are Joseph I. Bluhm, '41, Chief of the Applied Mechanics Research Laboratory in the U.S. Army Materials and Mechanics Research Center, Watertown, Mass.; and Herbert Wegener, '61, Senior Associate Engineer with the I.B.M. Corporation in Endicott, N.Y.

Harold S. Mickley, Sc.D.'46, Director of the Center, emphasizes the Program's role in the continued education of professional engineers, giving them opportunities to catch up on technology developed since their own student days. Many areas now vital in engineering—solid-state physics and time-shared computers, to name two—were little known or taught a decade ago, he says. "The business of being up to date and informed in technology is not an abstraction in today's rapidly changing world of technology."

Arthur L. Goodrich, 1876-1967

The M.I.T. community has belatedly learned of the death on July 10, 1967, of Arthur L. Goodrich, '98, Emeritus Associate Professor of Drawing and Descriptive Geometry in the Department of Mechanical Engineering, at the age of 90.

Professor Goodrich joined the M.I.T. staff as an assistant in 1902, soon after his graduation in chemical engineering. He became instructor in 1905, joined the faculty as Assistant Professor in 1917, and served as Associate Professor for 21 years preceding his retirement in 1947.

Individuals Noteworthy

James R. Killian, Jr., '26, Chairman of the M.I.T. Corporation, has been named to the Committee on Public Engineering Policy of the National Academy of Engineering. Dr. Killian recently became Chairman of the Board of Trustees, The MITRE Corporation. **George A. Morton, '26,** is the second recipient of the David Richardson Medal which is awarded "for outstanding contributions in the application of optics." Currently he directs the Conversion Devices Laboratory of the Radio Corporation of America.

Schuyler Kleinhans, '27, has been elected a Fellow of the American Institute of Aeronautics and Astronautics. **Edward H. Holmes, '28,** is now Director of Policy Planning in the Department of Transportation's Federal Highway Administration. **Samuel R. Weibel, '28,** received the Commendation Medal of the U.S. Public Health Service for "his ability to recognize and characterize significant problem areas, and to instigate programs for their solution. . ."

Emilio G. Collado, '31, Executive Vice President of Standard Oil Company (New Jersey) and Brigadier General **Leo A. Kiley, '39,** Commander of the Air Force Missile Development Center at Holloman Air Force Base, N.M., received honorary degrees from New Mexico State University. **Manson Benedict, Ph.D.'32,** Head of the M.I.T. Department of Nuclear Engineering, is on the Research Advisory Board of the Cities Service Company. **David W. Bernstein, '32,** is now President of American Biltrite Rubber Company. **Charles B. McCoy, S.M.'32,** was named Vice Chairman of the Executive Committee of E. I. du Pont de Nemours and Company.

N. G. Dumbros, S.M.'34

Raymond H. McFee, '37

Nicholas G. Dumbros, S.M.'34, is now Vice President—Industry Affairs of the Marathon Oil Company. Brigadier General **Joseph M. Colby, S.M.'35,** is now Vice President—Technical Growth, Rockwell-Standard Corporation. **Rush B. Lincoln, Jr., S.M.'35,** has resigned as General Manager of the Massachusetts Bay Transportation Authority. He said that his work "of expanding the transportation system into the suburbs was completed."

Benjamin F. Schlimme, S.M.'35, is now General Manager of the International Department of E. I. du Pont de Nemours and Company; **Edward R. Kane, Ph.D. '43,** succeeds Mr. Schlimme as General Manager, Industrial and Biochemicals Department in that company. **William P. Kennedy, S.M.'36,** is now Director—Commercial Aircraft Analysis of the Lockheed Aircraft Corporation. **Robert B. Woodward, Ph.D.'36,** Donner Professor of Science at Harvard University, is the 1967 Willard Gibbs Medalist of the American Chemical Society.

Wells Coleman, '37, received the Edward P. Connell Award from the American Gear Manufacturers Association. He is Senior Research Staff Engineer of the Gleason Works in Rochester, N.Y. **Richard H. Ewert, '37,** is a Trustee of Illinois College, Jacksonville, Ill. **Raymond H. McFee, '37,** is now Associate Director of the Advanced Research Laboratories, Douglas Aircraft Company. **Donald G. Robbins, S.M.'38,** is now Treasurer and Chief Financial Officer as well as Vice President of the Singer Company. **Firm L. Weaver, '38,** is now Manager of Engineering, Turbine Division of De Laval Turbine Inc.

W. P. Kennedy, S.M.'36

Richard H. Ewert, '37

Adolph L. Antonio, Sc.D.'39, has been appointed Senior Vice President—Research and Technology of the Aerojet-General Corporation. **Roy W. Carlson, Sc.D.'39,** holds the Turner Medal of the American Concrete Institute "for his many outstanding original contributions to concrete technology, design, and construction; and in recognition of the further advances which have resulted from his development of research and measuring techniques." **Courtland D. Perkins, S.M.'41,** and **Henry Loomis,** Administrative Assistant to the President of M.I.T. in 1947-1950, have been elected Trustees of the MITRE Corporation.

George L. Gore, '42, was elected President of MGD Research and Development Corporation. He will be responsible for research and development in Fair Lawn, N.J., and continue as Engineering Vice President for Dexter Company. **Milton M. Platt, '42,** is the recipient of the Harold DeWitt Smith Memorial Medal from the American Society for Testing and Materials. The medal is awarded for outstanding achievement in the science of textile fiber utilization.

Richard C. Grant, '44, has been elected Vice President and General Manager, Northeastern and Southeastern Regions, United States Envelope. Dr. **Paul Talalay, '44,** is serving on the National Advisory Cancer Council for a four-year term. **Claude W. Brenner, '47,** is now General Manager of the Custom Equipment Division, Systems Group of E.G.&G., Inc. **John G. Truxal, '47,** is now on the Joint Technical Advisory Committee which is sponsored by the Institute of Electrical and Electronics Engineers and the Electronic Industries Association.

Ralph F. Cameron, '48, has been named Assistant Vice President of the International Nickel Company, Inc. **Elias J. Corey, '48,** has won the Fritzsche Award of the American Chemical Society. He has synthesized and determined the structures of many terpenes—essential to the cosmetics, paint, lacquer, and varnish industries. **Morton Deutsch, Ph.D.'48,** is the recipient of the Kurt Lewin Memorial Award of the Society for the Psychological Study of Social Issues. The award is the nation's highest honor in the field of social psychology. Dr. Deutsch is Carl I. Hovland Lecturer at Yale University.

Gordon O.F. Johnson, '48, is now President of LogEtronics Inc. **Albert J. Kelley, '48,** Deputy Director of N.A.S.A.'s Electronics Research Center in Cambridge, has been awarded the space agency's Exceptional Service Medal for his contributions to N.A.S.A. electronics research programs. **Robert G. Loewy, S.M.'48,** is Dean of the College of Engineering and Applied Science at the University of Rochester. **Robert L. Stern, '48,** is serving as Executive Secretary, Committee on Public Engineering Policy of the National Academy of Engineering.

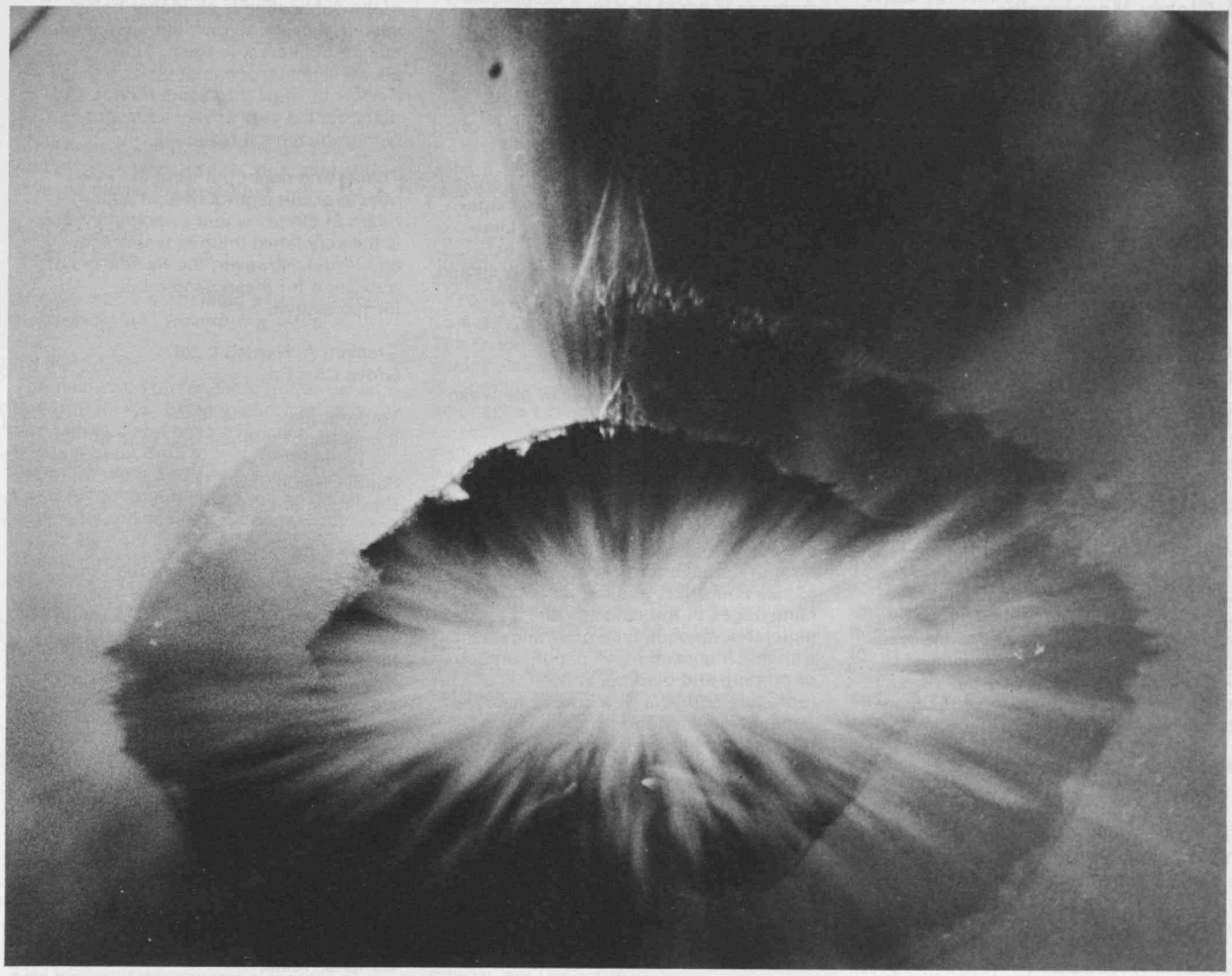
Robert D. Anding, S.M.'49, is now Vice President of Enjay Chemical Company. **John J. Glover, S.M.'49,** is now General Manager of Jefferson Chemicals U.K., a partnership of Texaco U.K., Ltd. and Cyanamid of Great Britain, Ltd. **Thomas J. Lamphier, '49,** is now Vice President—Administration in the Executive Department of Great Northern Railway. He will direct the company's computerization program. **Henry S. Rowen, '49,** has been appointed to the National Advisory Health Council to serve with other distinguished leaders in providing advice on health affairs to the U.S. Surgeon General. **Sherwood B. Stockwell, '49,** has been named to the San Francisco City Planning Commission.

Harry C. Gatos, Ph.D.'50, has been elected President of the Electrochemical Society, Inc. **T. Marshall Hahn, Jr., Ph.D.'50,** has been elected a Director of Oak Ridge Associated Universities. **Murray Gell-Mann, Ph.D.'51,** is the recipient of the Franklin Medal of The Franklin Institute. Dr. Gell-Mann, considered to be the foremost elementary particle theorist in the world today, was cited as one who "has done most to advance a knowledge of physical science or its applications."

James M. Symons, Sc.D.'57, is the recipient of the Walter Huber Civil Engineering Research Prize of the American Society of Civil Engineers. The award is for "laboratory and field research on reservoir water quality behavior that has led to. . .extensive new knowledge on water quality changes in impoundments."

Strobe Probe

Harold E. Edgerton, Sc.D. '31



Mystery Photograph

This is a double flash photograph of high-velocity fragments coming from the end of a dynamite cap. The second exposure *apparently* shows that a *particle* has *increased* in velocity when compared to the first photograph! This is impossible since there is nothing present to accelerate the particle! What is the explanation? Note: The angle of the shock wave caused by a particle is an indication of the speed of the particle speed.

Correspondence Review

I. Glossy Monstrosity

To the Editor:
Just received my November *Technology Review,* and I am disgusted. Try to adopt a rational way of thinking and immediately discontinue that abominable sans-serif typeface used in the November issue. It hasn't any character. It is hard on the eyes—too solid black! It is hard to read! Each page looks like one blotchy, black blur. Bah! If it is considered an improvement, God help M.I.T. I'm sure it will lose readership for the *Review.*

Albert W. Chase, '17
Foxboro, Mass.

To the Editor:
Unless there has been new evidence to the contrary, sans-serif typefaces are far more fatiguing to the eye and less readable than conventional body copy faces. I know this is contrary to what might be considered common sense. There have been many studies to bear out this notation. Therefore, in this context I think you would be very well advised to reconsider some of the typographic design in the new format of *Technology Review.* I hope this doesn't sound like the aging alumnus reacting to change.

Norman H. Kreisman, '48
Washington, D.C.

To the Editor:
Your October/November issue: an unreadable monstrosity! I am an ex-editor myself who favors any change—providing it is an improvement.

Edgar L. Woodward, '11
Pacific Palisades, Calif.

To the Editor:
Technology Review, under its new editorial direction and in its new dress, is probably an incomparable improvement over the old product, but I am unable to say so for sure. The new typography makes it incredibly difficult to read—or was this the intention in restyling the book? The new *Technology Review* seems to me to be the Word made Flesh from the gospel according to Marshall McLuhan: The medium is the message. The medium here comprises the typefaces, the ink, and the paper; the message is concealed by sans-serif, flush-left-only and other typographical *bossa nova.* Compare the editorial pages of the October/November issue with the advertising pages, where the people preparing the copy really want to get their message across. Look at the First and Old Colony ad on page 1 or American Airlines' on page 5. Forget the Mickey Mouse and give us a magazine that is a pleasure and not a challenge to read. Tech may be hell, but that's no reason why *Tech Review* should be, too.

William Hines
Washington, D.C.

The writer is Science Editor of the Washington Star.—*Ed.*

To the Editor:
The Volume 70, Number 1 issue of *Technology Review* was quite a disappointment to the writer, not in its contents but with the glossy, sophisticated style of format and makeup, its change of size and price, and the ragged right-hand edges of the columns and a general scrapbook type of arrangement with much unused blank paper. The job of printing and binding, in itself, is above reproach, and your new source has done its job well; the complaints I mention start in the editorial room. In either the two-column-per-page sections or the three-column-per-page sections those ragged right-hand edges annoy me, comparing them with the trim, workmanlike style of previous *Reviews* and—in fact—most of the other current magazines. They remind me of my own (still amateur) efforts on the typewriter.

Howard S. Currier, '13
Carmel, Calif.

To the Editor:
It seems to me that the new format of *Technology Review* gives preference to advanced layout and typography features that are of much greater interest to those seeking the very latest in this field rather than an alumnus reading the *Review* for items of interest. After all, typography, layout, etc., are for utility as well as appearance. When everything is sacrificed for features that are extremely advanced, then it seems to me that the principal purpose of the publication is no longer being served; namely, to give the alumni information of interest to them. After all, an alumnus does not pick up the *Review* to show it to some friends and point out the very advanced layout and typographaphical features.

There is no doubt but what the new effects excite a great deal of admiration in circles where principal interest is the very latest thing in typography and layout. However, the *Review* is not published for these people but for the alumni.

Crockett A. Harrison, '26
Grove City, Pa.

To the Editor:
It may be art, but can you read it?

Sander Rubin, '51
New York, N.Y.

To the Editor:
As I try for the third time to read the latest issue of *Technology Review,* I feel I must let you know my reaction to the new type and layout used. Frankly, I can't read the editorial copy. Since most of the ads give no visual trouble, the type used must be the reason the copy shimmers. It literally hurts my eyes. Probably the stark black on white aggravates the problem. I have asked others to read this issue and their opinions paralleled mine. It's admirable to bring innovation and productive change to any publication; I think you and your colleagues widely missed the mark on this one.

H. Allen Stormer, '50
Garland, Texas

To the Editor:
I have nothing but praise for the contents and the handsome, modern layout of the new *Technology Review,* but I feel compelled to register a negative vote on the sans-serif typeface. Even with the desirably narrow columns I find it difficult to read—and monotonous. It makes me yearn for the graceful old types such as Garamond or Bookman or even Caslon. Put me down as hopelessly old-fashioned.

Harold Bugbee, '20
Winchester, Mass.

To the Editor:
Your new *Technology Review* format is almost unreadable. Please go back to a more easily scanned format!

John C. Champeny, '51
Boston, Mass.

II. Stimulating and Superb

To the Editor:
The format and production of the October/November issue of the *Review* appear to be excellent and the type you have adopted is much easier on these old eyes. I am marveling that you have been able to get so much into about the same size with all the white space, the larger, heavier typeface and no justification at the right margin.

Carole A. Clarke, '21
Brielle, N.J.

To the Editor:
My warmest congratulations on *Technology Review*'s new layout, format and even its stock. It's beautiful!

Patricia Parker
Boston, Mass.

Mrs. Parker is associated with Kalb and Schneider, Inc., Advertising.—Ed.

To the Editor:
The new issue of *Technology Review* is one of the most exciting and interesting and stimulating I have ever seen.
It was a great thrill to leaf it through the other night and see what you have done. Undoubtedly there will be much comment and some of it critical. One has to be daring, however, and strike out in new directions in order to come up with a final format that pleases the majority of the people.

Samuel A. Groves, '34
Boston, Mass.

To the Editor:
Congratulations to you and the staff for the major graphic change-over of the *Review*. One more piece falls into place in the development of an M.I.T. graphic identity!

Kenneth G. Scheid, '44
Pittsburgh, Pa.

To the Editor:
I must say I was very impressed by the new type and the general clearness of the layout. It is a big improvement—one that befits a publication from an institution like M.I.T.

William G. Osmun, '40
Washington, D.C.

To the Editor:
Your new format, typography, and greatly improved taste in graphic arts is greatly appreciated. Also the removal of your logo to even-numbered pages and the fairly uniform printing of odd-page numbers without logo, removes my previous major objection to your format.
Can you clean up your advertisers as effectively? (Please *at least* establish a standard for front-of-magazine full-page ads and back cover.) Can you afford color photography? Or should I ask, can you keep it this good? Please do so.

Leo J. Rotenberg, '65
Madison, Wis.

To the Editor:
May I congratulate you on the format and the content of the recent issue, particularly the article by Dr. Allen.

Brian P. Parker, '53
Berkeley, Calif.

To the Editor:
A beautiful and creative job of typography, and a big surprise to us out here! Just seeing the material, the looks and the layout, makes it very clear that you put a great deal of thought into it before making your decision.

John E. Pfeiffer
New Hope, Pa.

Mr. Pfeiffer is a free-lance science writer, former President of the National Association of Science Writers.—Ed.

To the Editor:
The October/November issue of *Technology Review* in its new, enlarged format is certainly an outstanding magazine among the college publications.

Philip B. Walker, '07
Whitinsville, Mass.

To the Editor:
I want to tell you how impressed I am by what may fairly, I think, be called the new *Technology Review,* and both as to form and substance. The form is such as to make one look at the substance more thoroughly than I, at least, did in the *Review*'s old form, so I suppose any comparison of substance I make may not be a fair one, for I am afraid I rather skimmed the old. However that may be, I liked the substance in this last issue, for it gives to us old grads a good picture of what is going on, even though we may not be able to quite comprehend some things. And the emphasis on the part technology and M.I.T. are playing in improving and developing the welfare of the country and the world is most enlightening.

Ellis W. Brewster, '13
Plymouth, Mass.

To the Editor:
I want to say how much I like the new look of *Technology Review*. I think the new format is very handsome, and I admire the consistent way in which the graphics were carried through, even extending to some of the advertisements.

Stephen A. Kliment, '53
New York, N.Y.

The writer is Editor of Architectural and Engineering News *magazine.—Ed.*

To the Editor:
The October/November issue of *Technology Review* is superb. Your editorial approach makes a great deal of sense and will prompt, I am certain, serious comparison and re-evaluation by editors and publishers.

Robert H. Breunig
College Park, Md.

The writer is Coordinator of Information Services at the University of Maryland and Editor of The Maryland Magazine.—*Ed.*

To the Editor:
Congratulations on the new format for *Technology Review*. It is a pleasure to look at and read.

John R. Ehrenfeld, '53
Lincoln, Mass.

III. A Note About the New Review

Technology Review's new typography, which has stirred such a variety of strongly felt response, is the work of Ralph Coburn, '47, who has been associated with the M.I.T. Office of publications since 1957. His effort has been to reflect in the visual design of the *Review* the unique qualities of the Massachusetts Institute of Technology as it stands today—its reliance upon structure and logic; its central concern for the contemporary; its commitment to research and experiment; and its broad interest in the implications of modern technology and social science for people everywhere and for people in all human affairs.

The typeface is Helvetica, one of several sans-serif faces first introduced in Europe in 1957. Helvetica is an adaptation of earlier sans-serif faces notable for its design in conformity with optical laws. The individual letters are large and "create a restful rhythm in the appearance of the word." The type is set without "justification," producing an irregular right-hand margin in the column, in order to make possible uniform spacing between letters and words. The geometric qualities of the Helvetica typeface itself are thus sustained as it is made into words and sentences. Indeed, many typographers now believe that the variable spacing necessary to achieve "justified" columns is an irrational typographic element which impedes the reader.

If the *Review*'s new typography seems to some readers too radical a change, they may be interested to know that the magazine has had no systemic typographical revision since 1941, a 26-year period in which the Institute and indeed all of modern technology have experienced vast transformation. They should understand, too, that the *Review's* new design now appears in the same spirit of innovation and experiment which characterizes other M.I.T. endeavors—subject to constant evaluation and, we hope, perfection.—*Ed.*

Puzzle Review

Allan J. Gottlieb, '67

Every month the editor and I have been having a friendly war concerning my deadline. I would like it as late as possible in order to include late responses, whereas he needs it early to purge my many mistakes. We have been effecting a compromise which causes several good solutions to be passed up and a few errors to slip by. It appears that a more reasonable alternative is to allow two issues to pass before printing solutions. I realize that some hardship may occur in having to wait an extra month for the answers but my defenses are that it *is* necessary to wait the extra month and that *American Mathematics Monthly* has a delay time of about one year.

There is a possibility that Puzzle Review may appear in another magazine outside the M.I.T. community. In order to expedite handling kindly include with your solutions the problem, number, issue, and name of the magazine in which the problem appeared.

Problems

10 The first problem this time is from Howard S. Currier, '13:

A farm horse is tethered to one corner of a barn 25 feet square, in the middle of an open field, with a rope 100 feet long. What is the area the horse can graze on?

11 Eugene W. Sard, '44, sends us the following:

Here is a problem for the Puzzle Review in the area of Diophantine analysis that had its genesis in my boyhood while listening to radio broadcasts of the old Brooklyn Dodger baseball games. About two years ago it finally crystallized in the following form:

In baseball, how is it possible for a batter to get a hit and thus raise his batting average exactly one point? A trivial solution may immediately come to mind, namely, the batter who has gone hitless for his first 999 times at bat and then gets a hit to raise his average from .000 to .001. Two related nontrivial solutions (the only ones, I believe) are enclosed.

12 Theodore M. Edison, '23, submits the following:

In the course of trying to find the factors of a number, I developed the following equation:

$x^2 + 2xy + y = 4uv + u - v.$

My line of reasoning led me to believe that it should always be possible to solve this equation in positive whole numbers (greater than 0) with arbitrary values assigned to either x and y, or u and v. Eventually I was able to prove that my belief was correct, but not without some trouble. Solutions are not necessarily unique. For example,

let $u = 3$ and $v = 2$: then one solution is $x = 1$, $y = 8$, and another is $x = 4$, $y = 1$ (in addition to zero solutions such as $x = 0$, $y = 25$, or $x = 5$, $y = 0$).

Perhaps this would all be obvious if I were familiar with the theory of numbers, but I thought that the problem of finding the proof mentioned might be of enough interest to merit inclusion in your puzzle department.

13 Charles D. Coltharp, '58, wonders who can handle this one:

Here's a variation on an old problem. A community has N institutions of higher learning and decides to form a football league. The committee, upon learning that one of the football players is taking a math course (his name was Ryan, or something like that), assigned to him the task of arranging the schedule.

They stipulated each team was to play every other team once, each team was to have one idle weekend during the season, and no team would play two consecutive games either at home or away. Only one team could be idle on a given weekend. Fortunately for Ryan, N was odd. What were his chances of delivering a schedule?

14 And another from Charles D. Coltharp, who wants you to prove that a nonstandard ball can be determined in n weighings from a set of $(3^n-1)/2$ plus 1 balls, one of which is marked as standard.

Speed Department

SD4 The only entry this time came from Michael R. Gabel, '65:

Let n_0 be a number, n_1 be the number of letters in the spelling (in English) of the number n_0, . . . , n_k be the number of letters in the spelling of n_{k-1}. Prove $\lim_{k\to\infty} n_k = 4$

Show this is independent of the language used.

Better Late than Never

There has been some discussion as to the validity of the solution to the seven cigarettes problem published in the *Review* last March. The problem, numbered **15** last year, is to place seven unbent cigarettes such that each one is touching the other six. The (apparently) definitive solution has now been submitted by J. W. Langhaar:

In the perspective view, right, the shortest possible cigarettes would have ends of axes of 1 and 5 coincide and outer ends of axes of 2 and 5 coincide, and similarly for other pairs. It must be shown that cigarettes have 4D large enough; for larger 4D, axes can cross. Let a cigarette have unit radius; the problem then is to determine PA.

Consider a more general case for a central cigarette of radius r possibly different from the unit radius of the other six.

The small circle, far right, is the central cigarette of radius r. The larger circle of radius $(r + 1)$ is the circle to which the axes of the other cigarettes are tangent. If C is the origin in the usual coordinates, the location of A is $(\sqrt{3}\,r, -r - 1)$. Therefore $\overline{CA}^2 = 3r^2 + (r + 1)^2$. But $\overline{CT} = r + 1$; therefore $\overline{AT}^2 = \overline{CA}^2 - \overline{CT}^2 = 3r^2$ and $\overline{AT} = \sqrt{3}\,r$.

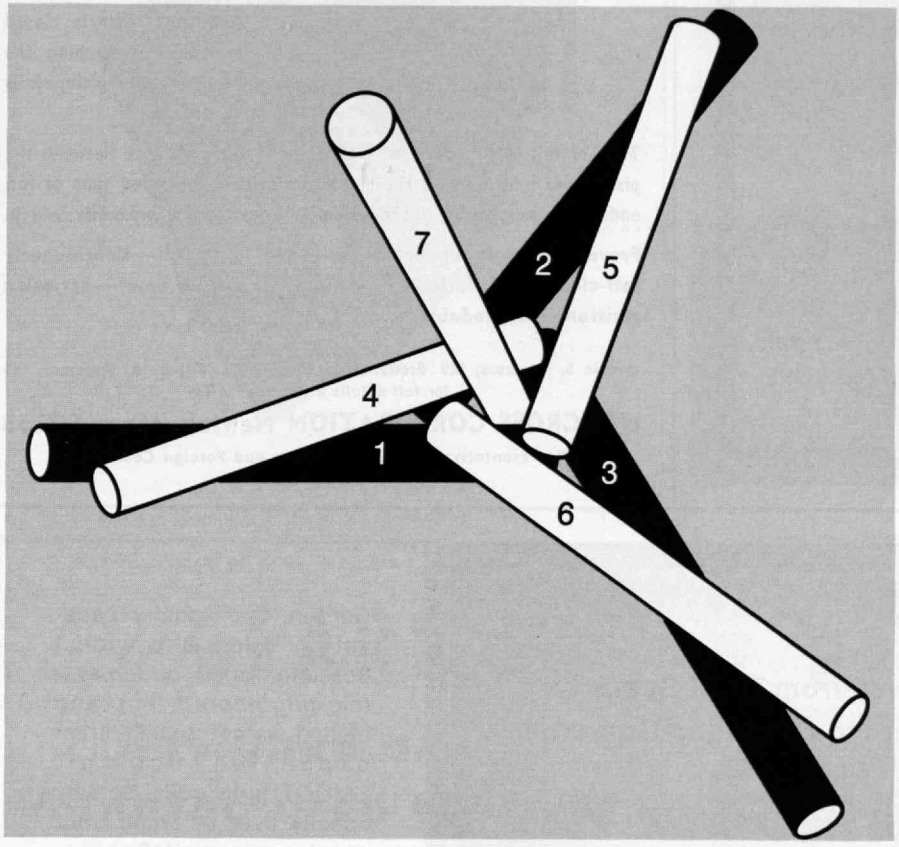
Let angle $ACT = \alpha$ and angle $TCP = \beta$. By symmetry, angle $BCA = 120°$; therefore $\alpha + \beta = 120°$

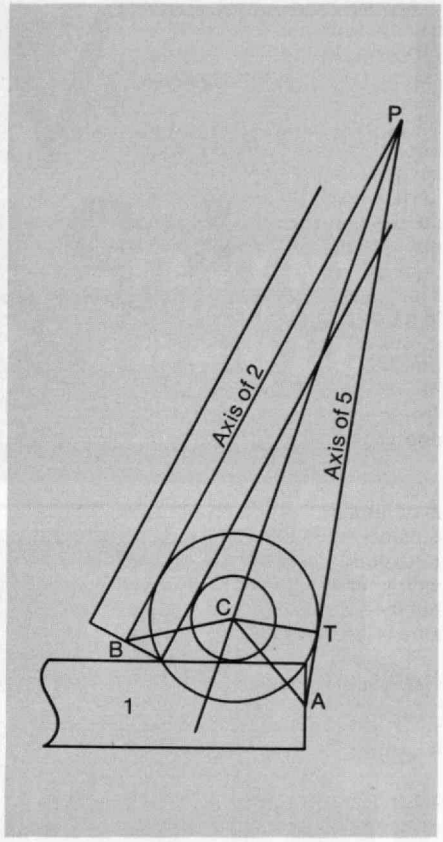
$\overline{PT} = \overline{CT} \tan \beta = (r + 1) \tan \beta$

$\overline{PA} = \overline{PT} + \overline{AT} = (r + 1) \tan \beta + \sqrt{3}\,r$

$\tan \alpha = \sqrt{3}\,r/(r + 1)$

$\tan \beta = \tan (120° - \alpha) = (\tan \alpha + \sqrt{3})/(\sqrt{3} \tan \alpha - 1)$





$$\overline{PA} = \frac{(r+1)\,[\sqrt{3}r/(r+1)+\sqrt{3}]}{\sqrt{3}[\sqrt{3}r/(r+1)]-1} + \sqrt{3}\,r$$

$= \sqrt{3}\,(r + r + 1)(r + 1)/(3r - r - 1)$
$+ \sqrt{3}r$
$= \sqrt{3}(2r^2 + 3r + 1 + 2r^2 - r)/(2r - 1)$
$= \sqrt{3}\,(4r^2 + 2r + 1)/(2r - 1)$
$= \sqrt{3}[2(r + 1) + 3/(2r - 1)]$
= the minimum length/radius.

This leads to the following table of values:

r	*L/R min.*	*L/D min.*
0.5	∞	∞
1	$7\sqrt{3} = 12.12$	6.06
1.366*	$6.46\sqrt{3} = 11.20$	5.60
2	$7\sqrt{3} = 12.12$	6.06
3	$8.60\sqrt{3} = 14.90$	7.45
4	$10.43\sqrt{3} = 18.06$	9.03
6	$14.27\sqrt{3} = 24.72$	12.36
10	$22.16\sqrt{3} = 38.38$	19.19

* i.e. $(1 - \sqrt{3})/2$, which yields minimum $(L/R) = (3 + 2\sqrt{3})\sqrt{3}$.

For the basic problem, r = 1. A king-size cigarette has 4D $\simeq$ 3.9/.33 $\simeq$ 11.7, which is greater than the minimum required; the construction is therefore possible.

78 George H. Borrmann, Jr., '57, has a generalization which is similar to problem 14 in this issue.

79 Many people noticed that a smaller answer is possible. Among them were: Kenneth B. Blake, '13, Theodore M. Edison, and J. Edward Philbrick, '32.

80 George H. Ropes, '33, solved the coconut problem and proposes a generalization which will appear next time. Russell A. Nahigian, '57, has a method for finding the *smallest* number of coconuts.

81 Many have noticed the trouble with last year's answer: Russell A. Nahigian, Howard S. Currier, Martin D. Landau, '47, Donald A. Trumpler, Ph.D.'58, James Theodosopoulos, '48, Edward C. Booth, '25, J. Charles Forman, '53, R. K. Broome and L. R. Mazur, John W. Sanborn, '26, Bruce P. Layton, '60, Charles D. Coltharp, David W. Ulrich, '52, and Peter E. Lobban, '66.

Allan J. Gottlieb, '67, is a graduate student in mathematics at Brandeis University. "Puzzle Review" is written for *Technology Review* and *Tech Engineering News*, the M.I.T. undergraduate professional magazine.

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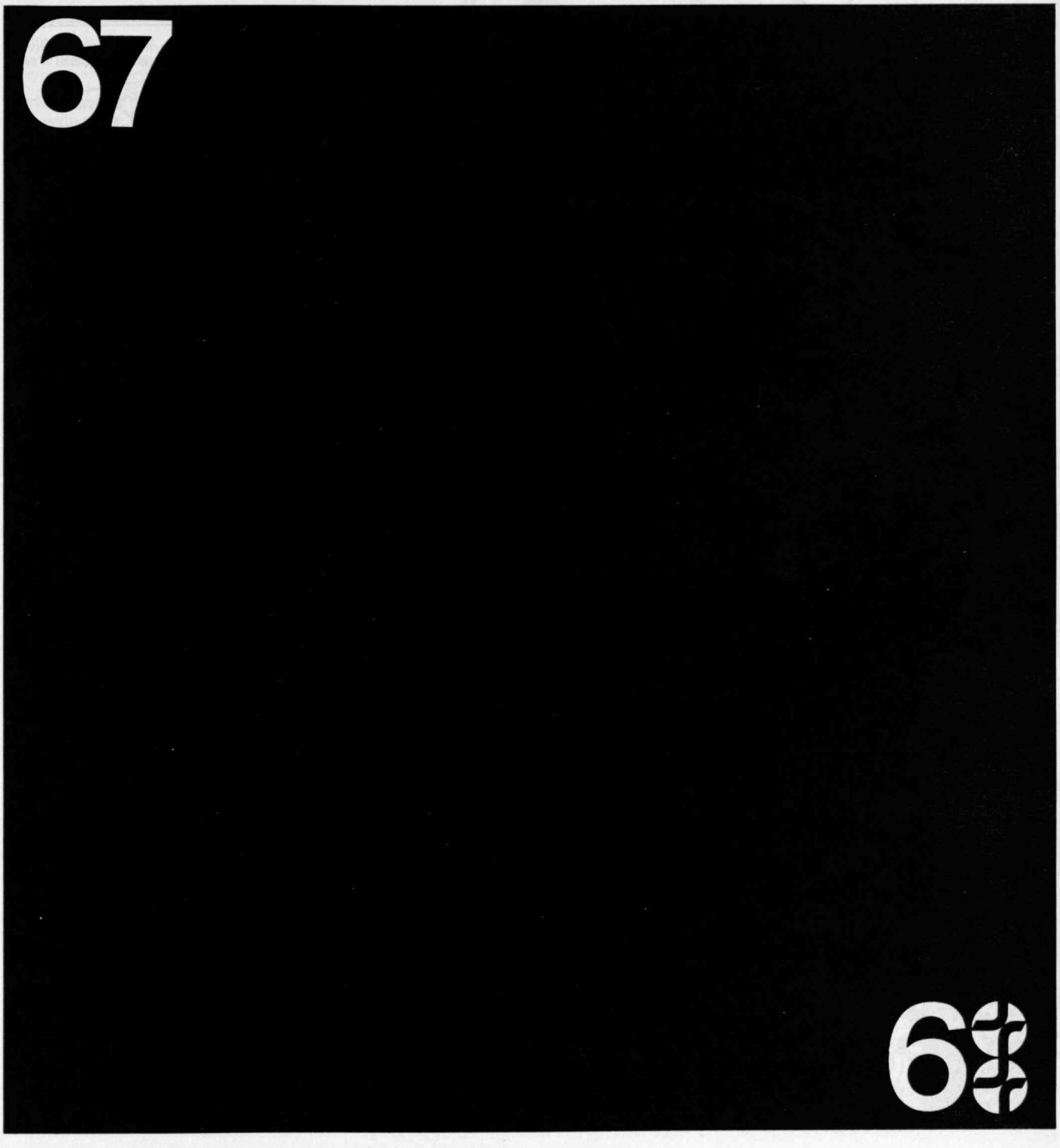
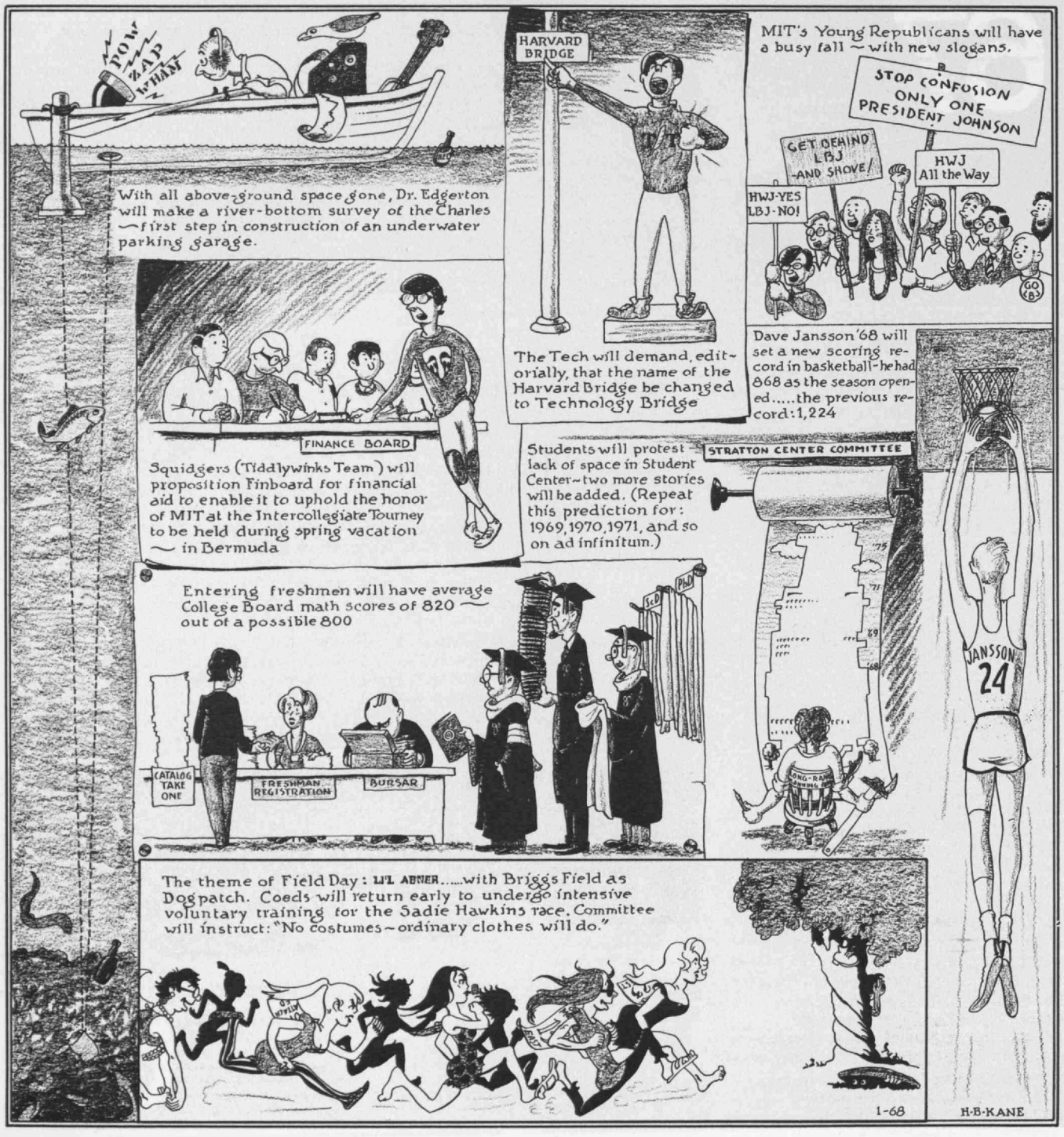
Alumni Review



Kane on M.I.T.

The REVIEW predicts ...for 1968



Alumni Review

Alumni Council:
The Villains Behind Hospital Costs

"Invention has become the mother of necessity," Dr. John A. Knowles, Director of Massachusetts General Hospital, told the Alumni Council at its regular meeting on November 27, and this is how new technology is forcing upward the cost of medical care in the U.S. But new technology is not the only villain, he said; hospitals are only beginning to pay reasonable wages to their employees, properly depreciate their plant and equipment, and to command and effectively use administrative talent. Of today's hospital income, Dr. Knowles said, 70 per cent goes to pay the salaries of employees, of whom there are an average of 3.2 per patient. Dr. Knowles charged that most employees in most hospitals are grossly underpaid; only in 1970 will hospital employees be covered by the national minimum wage statutes, and Dr. Knowles's Massachusetts General Hospital is one of the few that has taken the lead in meeting these minimal standards before they are enforced.

But new technology has been a significant factor in recent increases in the price of hospital care. It has pushed hospital costs upwards in three ways: it has increased the demand for technically qualified hospital workers to man the new machines, and these are in short supply and command rising wages; it has increased hospital expenses for new equipment and facilities and for depreciation of these machines which are often outdated quickly; and it has forced alterations in hospital physical plants to accommodate new equipment and new ways of using it. The result is that patient care in some intensive-care units where there is the greatest concentration of technology costs now at least $200 a day compared with today's average figure of $80 per day. The role of technology in medicine, said Dr. Knowles, has been to increase patient services, never to lower costs; and the cost of some developments which have been promised for the future, such as the use of computers in medical management and diagnosis, seem to be literally prohibitive for most institutions.

Yet for all technology's impact on hospital operations and costs, there is little communication between doctors and engineers. "I never see in my office the people who develop this technology," Dr. Knowles said. He hopes for increasing cooperation, and he believes the recently announced cooperative program for health-related research between the Harvard Medical School and M.I.T. may make important contributions.

Alumni Fund Board:
Funding in a Competitive World

Though it is a major issue before all universities, financial need is not the only problem which confounds today's university presidents, Howard W. Johnson, President of M.I.T., told the Alumni Fund Board late this fall in Cambridge. The other, and sometimes even more demanding, question is the academic community's response to the pressing political and social issues before the American people.

Just as he is reassured about M.I.T.'s response to such issues, he is also certain that the Institute's future financial goals are achievable. Since "this is a competitive world." he concluded that M.I.T. must determine and describe its future financial needs in full detail. Accordingly, President Johnson said, he has published the total requirement for new capital funds of $135 million for the next decade, to cover increases in faculty salaries, student aid, and academic strength, and to further development at M.I.T. of "the whole environment" which is needed for effective education. He admitted to the Alumni Fund Board that these needs "will stretch us all." But they are "do-able things," he said, and he emphasized the special resources of understanding and commitment which the Institute brings to the task.

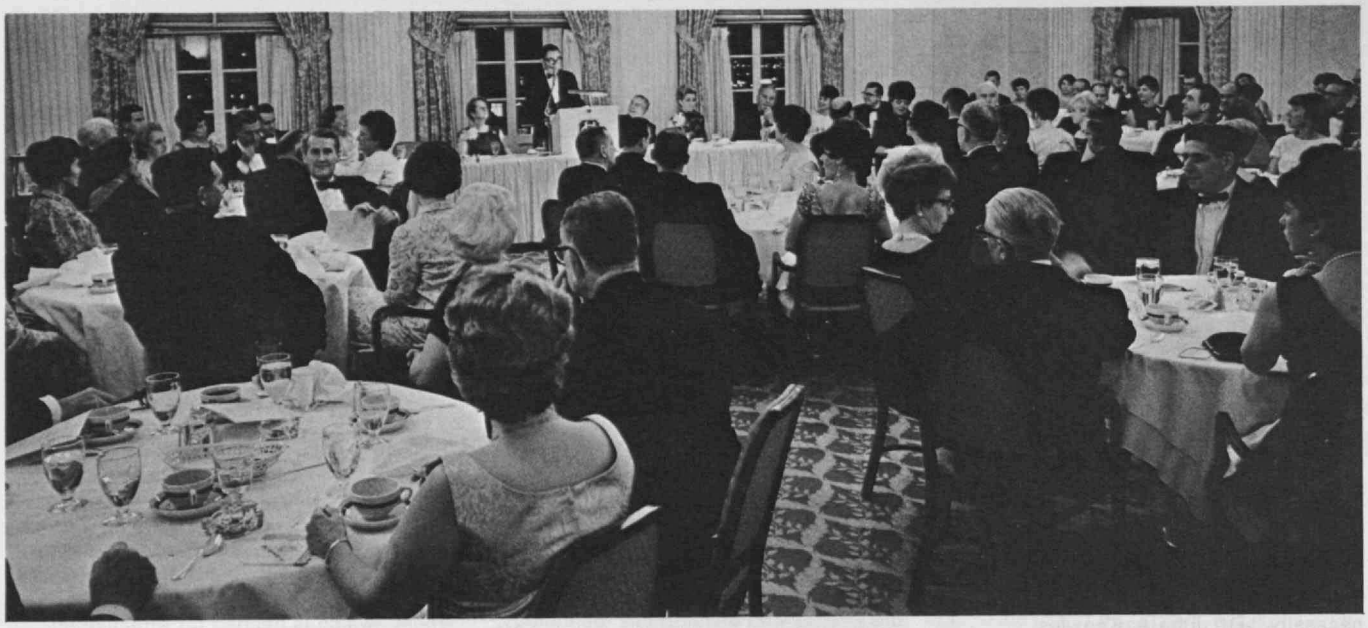
Alumni Clubs Advisory Board:
Toward Community Strength

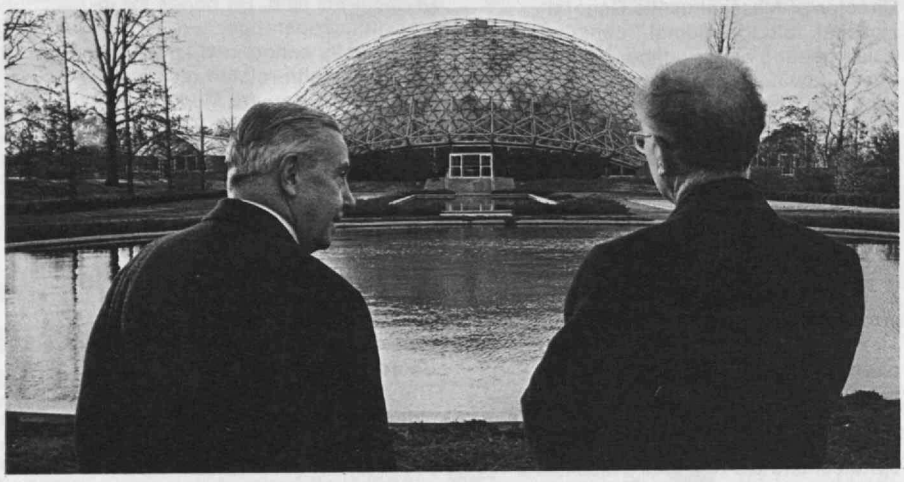
New support for the programs of M.I.T. clubs throughout the nation has been promised by William S. Edgerly, '49, following the first meeting of the Alumni Club Advisory Board.

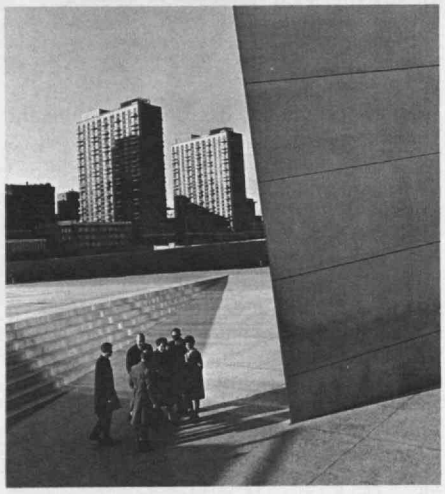
Preliminary discussion at the first meeting revealed that typical M.I.T. clubs are concerned especially with three operational problems: to maintain healthy club leadership through rotation of principal officers, to merit more participation by prominent alumni, and to develop the community strength required to undertake such major events as regional conferences.

Members of the Board will try to arrange their travel schedules during the coming year to permit occasional visits to M.I.T. clubs, Mr. Edgerly said in a report to M.I.T. club officers, and plans

M.I.T.'s present and future financial commitments were reviewed with the Alumni Fund Board late in November by Joseph J. Synder,'44 (far left), Treasurer of the Institute, and Howard W. Johnson (left), President. With them at the head table were Howard L. Richardson,'31, Chairman of the Alumni Fund Board, and Kenneth S. Brock,'48 (right), Director of the Alumni Fund.







During a crowded 24 hours in December with the M.I.T. Club of St. Louis, Dr. and Mrs. James R. Killian, Jr. ('26) were guests at a formal dinner of the Club (top with Merlin E. Lickhalter,'57, President of the Club, presiding); received a symbolic "Gateway Arch" from Thomas F. Eagleton, Lieutenant Governor of Missouri; toured the Climatron at the Missouri Botanical Gardens with its architect, Eugene J. Mackey, Jr., M.Arch.'39; and visited the Gateway Arch with Mr. and Mrs. Lickhalter and Dr. Harry W. Pfanz of the National Park Service (below right). Guests (lower left) at the dinner included Michael Witunsky,'43, at Dr. Killian's right, and the Very Reverend Paul J. Reinert, President of St. Louis University. (Photos: Frank/James Productions)

are underway for a spring meeting in Cambridge of M.I.T. club presidents. Two regional conferences—in Philadelphia and Dallas—are scheduled during the current year. Three will be planned for the 1968-1969 period, Mr. Edgerly said, and M.I.T. clubs interested in undertaking such conferences are invited to write him.

St. Louis:
Toward Centers of Excellence

The M.I.T. Club of St. Louis turned November 28 into an "M.I.T. Day" in that midwestern metropolis on the occasion of the visit of Dr. and Mrs. James R. Killian, Jr., ('26); the itinerary included a private luncheon for Dr. Killian, another for Mrs. Killian, a mid-afternoon press conference for Dr. Killian, special "V.I.P." tours of the St. Louis Gateway Arch and of the Climatron at the Missouri Botanical Garden, and a formal dinner at the University Club. Mr. and Mrs. Merlin E. Lickhalter ('57) were the Killians' official hosts for the day. Mr. Lickhalter is President of the M.I.T. Club of St. Louis, and Dr. Killian is Chairman of the M.I.T. Corporation. Eugene J. Mackey, Jr., M.Arch.'39, its architect, led the tour of the Climatron, the world's first geodesic-dome greenhouse.

Speaking at the dinner, Dr. Killian said there is "a mistaken assumption that the great growth of federal support of education, and especially of university research in science and engineering, has lessened the need for private support, at least in those fields where federal funds have become a dominant element." But actually, "the great influx of federal support has increased, not lessened, the needs of colleges and universities for private aid. I am convinced," Dr. Killian said, "that the time has come for the sources of really large private funds—individuals, corporations, and foundations—to recognize the importance of supporting the core needs of institutions as having priority over the support of new or peripheral programs. "In their preoccupation with finding new and innovative programs to support, grantors of funds may wind up supporting side shows while the main tent is falling down."

Harold E. Thayer, '34, was chairman of the dinner, the guest list for which included over 130 alumni, wives, and guests representing a broad spectrum of the leadership of the St. Louis community. Among the guests were the Honorable Thomas Eagleton, Lieutenant Governor of Missouri; George E. Pake, Vice Chancellor and Provost of Washington University; Joseph Pulitzor, Publisher of the St. Louis *Post-Dispatch;* and the Very Reverend Paul C. Reinhert, S.J., President of St. Louis University. Members of the M.I.T. Club of St. Louis who assisted as members of the committee included Norman B. Champ, Jr., '50, Ronald H. Lieber, '55, Ellis C. Littmann, '33, James Maguire, '38, and Stephen A. Wyers, '57.

Delaware Valley:
Deep-Sea Projects Discussed at Dinner

The M.I.T. Club of Delaware Valley held its fall dinner meeting at Stouffers Restaurant in central Philadelphia on Tuesday, October 24, 1967. Mr. D. Martin Harrell, of the Deep Submergence Systems Project of the U.S. Navy, reported on men living and working under the sea. Mr. Harrell has done considerable deep-sea diving himself, and the question and answer period following the presentation was very informative. About 110 members and wives attended. —Edward S. Halfmann, '36, Secretary, 432 Parkview Dr. Wynnewood, Pa. 19096

Dallas:
Urban Crisis Reviewed by M.I.T. Professor

Seventy members of the Wellesley and M.I.T. Clubs of Dallas met in the Colonial Room of the Ramada Inn on Thursday, October 26, for cocktails and dinner, After dinner Professor Leonard J. Fein of the Political Science Department of M.I.T. discussed "The Summer of Our Discontent" giving his thoughts on the urban crisis.—Lester Ackerman,'48, Secretary, 721 South Austin, Dallas, Texas

Club Calendar

Boston—luncheon meeting on January 11 at the Union Oyster House, Irwin W. Sizer, Dean of the M.I.T. Graduate School.

Los Angeles—dinner meeting on January 18 at the Statler-Hilton: Jerome B. Wiesner, Provost of M.I.T. and Professor of Electrical Engineering.

Central Florida—"Alumni Florida Festival" on January 27 in Orlando: James R. Killian, Jr., '26, Kenneth R. Wadleigh, '43, Dean of Student Affairs, Gregory Smith, '30, President of the Alumni Association, Alfred Keil, Head of the M.I.T. Department of Naval Architecture and Marine Engineering, the Logarhythms, and other; also inside tour of Cape Kennedy on Sunday.

Northern New Jersey—dinner meeting and tour of Bell Telephone Laboratories, Inc., Holmdel, N.J., on January 30.

Boston—luncheon meeting on February 8 at the Union Oyster House: William W. Seifert, Sc.D.'47, Assistant Dean of the M.I.T. School of Engineering.

Washington, D.C.—afternoon seminar on February 17 at the Institute for Defense Analyses: ocean engineering.

Chicago—dinner and theater party on February 23.

Atlanta—joint dinner meeting with Harvard Business School and Wellesley Alumni Clubs on February 29: Jerome B. Wiesner, Provost of M.I.T. and Professor of Electrical Engineering.

Philadelphia—day-long Regional Conference on March 9 at the Sheraton Hotel: Howard W. Johnson, James R. Killian, Jr, '26, Irwin W. Sizer, Dean of the M.I.T. Graduate School, Alfred Keil, Head of the M.I.T., Department of Naval Architecture and Marine Engineering, Secor Browne, Associate Professor of Flight Transportation.

Boston—luncheon meeting at the Union Oyster House on March 14: John Bush, Vice President of the Millipore Corporation.

Mexico—Annual Fiesta of the M.I.T. Club of Mexico on March 14-16 in Mexico City.

Northern New Jersey—concert by the M.I.T. Symphony Orchestra on March 25.

Chicago—concert by the M.I.T. Symphony Orchestra on March 27.

Dallas—day-long Regional Conference on March 30 at the Marriott Motor Hotel, "The City in the Year 2000": President Howard W. Johnson, Gregory Smith, '30, President of the Alumni Association, Dean Emeritus John E. Burchard, Walter A. Rosenblith, Chairman of the Faculty, Secor Browne, Associate Professor of Flight Transportation.

Cambridge—class reunions on June 7-9 and Alumni Day on June 10.

Deceased

Richard M. Lawton, '03, August 16*
Arthur D. Smith, '04, November 9
Robert B. Sosman, '04*
George H. Barrows, '05, November 5*
Bradford B. Holmes, '08, October 8
Herbert L. Jenness, '09
Lewis D. Nisbet, '09, October 12*
Lester C. Greenwood, '10
Edgar C. Savage, '11, July 19*
Benjamin B. Towne, '12, October 18
Alexander C. Besosa, '13
Edward Hubbard, '13
Clinton E. Pearce, '13
Edward L. Wadsworth, '13, June 4
Percy G. Whitman, '13
David M. Young, '13
Hiram Y. Waterhouse, '15, October 24
Marie I. Taveau (Mrs.), '16, November 5
Norman J. Vile, '16, August 30
Charles M. Black, '17*
Marcial E. Martinez, '20
John L. Keats, '20
Roger G. Mosscrop, '20, October 3
Henry L. Nash, '20, September 18
George W. Coffin, '21, October 4
Ronald O. Gubelman, '22, Nov. 2, 1966
John B. McCue, '22, August*
Thomas A. Quirk, '22, September 28
Lawrence E. Duane, '23
Ivan Tyler, '23, October 4*
True D. Canney, '25
George F. Geis, '25
Albert L. Taylor, '26, October 11*
John P. Campbell, '27, June 1
Edgar G. Gillion, '29, June 10
Harlan S. Thompson, '30, October 11
Arthur M. Stoner, '31, July
William Randolph Churchill, '34*
Harry B. Dodge, '40
Arthur J. Weinberger, '41*
John E. Chrisinger, '59, September 14
* Further information in Class Review

Class Review

95

The following obituary is from the *Daily Progress,* Charlottesville, Va. "**Judson Charles Dickerman,** chemical and investigation engineer for 50 years, died on August 27 at the age of 93. Mr. Dickerman was descended from Massachusetts founding fathers. Born October 15, 1873, in Boston, he was the son of the late Charles C. and Frances Louise Roche Dickerman. Mr Dickerman graduated from Boston English High School and took his B. S. degree in chemical engineering from Massachusetts Institute of Technology. The first 10 years after graduation he explored a new process in the manufacture of aluminum. He served as assistant professor of chemical engineering at the University of Wisconsin from 1905-09, after which he spent 35 years in supervision of public utilities for the Railroad Commission. His activities took him to almost every state of the Union, as well as to Mexico, Brazil and Puerto Rico. From 1927-28, Mr. Dickerman served as engineer examiner for the Federal Trade Commission. Later, he was consultant to various other enterprises concerning the Tennessee Valley Authority and the St. Lawrence River. Before his retirement in 1945, he served on the President's War Relief Control Board. He was a member of the Charlottesville Stamp Club, the National Society of Professional Engineers and the Westminster Presbyterian Church, where he has been a choir member for 20 years. Surviving are his wife, Mrs. Eleanor Robertson Dickerman; two sons, Dr. Charles P. Dickerman of Staunton and Ernest M. Dickerman of Knoxville, Tenn.; two daughters, Mrs. David B. Edmunds of Newport News and Miss Eleanor F. Dickerman of Charlottesville; and four grandchildren.—**Andrew D. Fuller,** Secretary, 1284 Beacon Street, Brookline, Mass. 02146

96

The message, "**Charles G. Hyde,** '96, has recovered sufficiently since the mild strokes of May and June, to walk a little with the aid of an attendant, and to spend the day in a wheelchair rather than the bed," was received in a note of October 5 from his son-in-law A. Van U. Dunn. . . . That '96 may correctly answer questions about it members, and even about one of the Class of '95, the Secretary telephoned Andrew D. Fuller, '95, on the 10th of November. After telling him that many of his friends were inquiring for him, Andy said, "Tell them I am fine and have not an ache or a pain, but I confine my travel to a few blocks in the vicinity of Coolidge Corner in Brookline. Thank-you for asking." . . . To contrast the present relations between students and administrators in several universities, Andy told me: "As a student I called on President Walker at his office in Rogers and asked him if I might put up a tennis net on the lawn beside Rogers. The President said yes, and we had a place to play tennis." . . . When I visited **George Harkness** in October he was expecting to go to Florida by plane with his nephew in a few days. He has been leaving Dorchester for 20 odd years to spend his winters in Florida. George was a '95 freshman, but spent the next year sailing with his father from California around the Cape to England.—**James M. Driscoll,** Secretary, 129 Walnut Street, Brookline, Mass. 02146

98

Albion W. Shaw sends greetings to his classmates of '98. He says that he is confined at home because of a bad leg. We are sorry that he is forced to be so inactive. . . . In Memoriam: Mrs. Roger W. Babson, 1963. Do you remember the delightful luncheons which she planned for the 1898 class members during June Alumni Days? Roger Babson's daughter, Edith, wrote to me in October about her stepmother. Edith married Mr. Lewis W. Mustard, Jr., and is living in Wellesley Hills. . . . Please, send news.—**Mrs. Audrey Jones Jones,** Acting Secretary, 232 Fountain St., Springfield, Mass. 01108

02

The last issue of the *Review* contained no class notes from our Class. No news was good news. This month brings news, but not of a pleasant nature as I have to report the sudden death of Col. **Lewis E. Moore** of Vero Beach, Fla., which occurred on October 23, 1967. He had been in seemingly good health and with Mrs. Moore had enjoyed a pleasant summer vacation at Sugar Hill in the White Mountains of New Hampshire before returning to his Florida home. On the 23rd he had an appointment at Miami. As it was in the afternoon, they decided to stay overnight and return the next day thus avoiding the traffic. He signed the hotel register with a firm hand but then sank quietly to the floor just as Mrs. Moore returned from parking the car. He had passed on. On Saturday the 28th services were held in his memory in the Newton Cemetery, Newton Center, Mass., where he had formerly lived. Moore had had an active career as is brought out in following biographical sketch which he wrote for the class records. "Lewis E. Moore was born in Amboy, Ill., on January 24, 1880. His father was Lewis Theodore Moore. His mother was Martha Myrick Wells. His parents moved to Chicago in 1881 where he grew up. He graduated from the Douglas (primary) School in 1893, and from the Chicago Manual Training (high) School in 1900. The following year he worked as master mechanic for a northern Michigan iron mine, and as a mechanical engineer for the American Tin Plate Company. In the fall of 1901 he entered M.I.T. as a special student taking the senior year in civil engineering with the class of 1902 with which he has been closely identified, becoming Class President in 1957 and Class Representative on the Alumni Council until he moved to Florida in 1958. From the spring of 1902 to the fall of 1903 he worked as a draftsman for the Phoenix Bridge Company at Phoenixville, Pa. In the fall of 1903 he went to the University of Wisconsin as an instructor in drawing and mechanics, leaving there in 1904 to teach theoretical mechanics and hydraulics at the University of Illinois at Urbana, Ill. He left there to go to M.I.T. as Assistant Professor of Bridge Design remaining there until 1914. From 1897 to 1907 he worked during various summers for the Illinois Central Railroad, the Western Electric Company and the

Bucyrus Steam Shovel Company.

While teaching at M.I.T., 1907 to 1914, he worked part time for the Massachusetts Railroad Commission as assistant bridge engineer. In 1914 the Railroad Commission was reorganized into the Public Service Commission, and he was offered the position of bridge and signal engineer which he filled until 1921 when he started his own consulting engineering practice. He followed this until he decided, in the summer of 1958, that having worked at engineering for 61 years he was entitled to rest upon whatever laurels he may have acquired along the way, so he sold out in Massachusetts and went to Florida. The consulting engineering consisted in part of rebuilding the Harvard Bridge on Massachusetts Avenue over the Charles River twice, once in 1924 and again in 1949; the design of all the bridges at Cottage Farm, including the interchange at the Cambridge end; several draw bridges, both swing and trunnion; several bus garages for the Boston Elevated; and a shop and garage for the Worcester Street Railway. After the 1938 hurricane he designed replacements for 77 destroyed bridges varying in span from 20 to 300 feet and personally inspected the foundations of all but one before construction of the pier. During 1940 and 1941 he took charge, at the request of the architect-engineer, of all the structural division of the reconstruction of Fort Devens, a work comprising among other things the building of 1000 barracks. He rounded out his practice by designing Storrow Drive with all its traffic interchanges, not all of which have been constructed though needed.

During World War I from April 1917 to December 1918 he was captain and major of engineers, working mostly on bridge design and construction in France. He designed the standard steel and wood structure for the American Army, and his wooden designs are still standard. On December 14, 1941, one week after Pearl Harbor, he was recalled to military service as a colonel of engineers and served in that capacity until October 1943. He then rebuilt his abandoned consulting practice and continued to work 15 years (which included the Storrow Drive) until he decided to retire. He was a Fellow of the American Society of Civil Engineers and a Past President of its Northeastern Section, a Past President of the Boston Society of Civil Engineers and of the Engineering Societies of New England, a charter member and former director of the Society of American Military Engineers and a Past President of the Boston Section. He married Rowena Grace Karns in Pennsylvania in 1903. She passed on in December 1956. Their daughter passed on in her 5th year in 1909. He has one son, Colonel Luther Samuel Moore of the U.S. Marine Corps, and a grandson, David Greenleaf Moore. To his fellow men he offers this aphorism gleaned from four score years of experience, "Using the same mental equipment, it is much easier to achieve financial independence through Wall Street than through the pursuit of the engineering profession."

Word has been received of the death of **Benjamin E. McKechnie** on August 25, 1967, at Carlsbad, N.M. He was born in Dorchester, Mass., January 3, 1881, and prepared for M.I.T. at Boston English High. He was a graduate of the mining course and followed mining, or closely related activities, throughout his career. He first served a year as a draftsman in New York City then became mine superintendent at Ashcroft, Colo., for two years. He was next located in Lebanon, Pa., as superintendent of the Concentrator Plant of the Pennsylvania Steel Company. He remained there until about 1917. In 1919 he became associated with the New Jersey Zinc Company in Franklin, N.J., and remained with them until 1927. In 1928 he moved to Denver and took charge of the mill work of the Kittimac Mines Corporation operating the new flotation process which gave promise of rejuvenating the worn out mines of Colorado. It is not clear how long he remained there, but in a short time he joined with the American Potash Company in Carlsbad, N.M., where he remained until he retired. McKechnie had an interesting hobby which he was able to pursue in his retired years. He had become interested in the plant life in his area and began collecting specimens of the various species. His interest was such that he took some special courses at the University of New Mexico and began to make color photos of the more beautiful flowers. As a result he had an extensive collection of specimens and an array of beautiful flowers.

Arthur Collier and Mrs. Collier made their annual trip along the Maine coast and report that they had a pleasant time in spite of the fog which hugged the coast most of the time this summer. In Brunswick they had a chance to see Grace Robinson, Robbie's widow, who still lives in the old home.—**Burton G. Philbrick,** Secretary, 18 Ocean Ave., Salem, Mass. 01970

03

Scotty Morse, who is still active in Minneapolis civic affairs, was surprised at the absence of news from '03 in the November *Review*. He asks, "Is it lack of news, or have you resigned or become ill?" Neither; but with the confusion of combining the October and November issues into one, things became confused so we missed a month. . . .Our M.I.T. scientists have been giving great import to the new facets of oceanography coming from Woods Hole Laboratory. At a recent conclave of electrical and electronic engineers at the New York Coliseum, Dr. Jacques Picard, son of the famed balloonist, revealed he will use the Gulf Stream to make a 2,000 mile under the sea voyage from Florida to Nova Scotia. The submersible is called a Mesocaph and will go through the middle depths of the Steam. The craft will be constructed in Switzerland and at the Grumman Aircraft and Engineering Corp., N.Y. The Mesocaph will be 50 feet in length, 12 feet in width and her 50 ton hull will be loaded with 20 tons of batteries, 4 tons of water and 1½ tons of storable air. . . . **Richard M. Lawton** of 1215 Prospect Ave., Plainfield, N.J., passed away on August 16, 1967.—**John J. A. Nolan,** Secretary, 13 Linden Ave., Somerville, Mass. 02143; **Augustus H. Eustis,** Treasurer, 1426 Canton Ave., Milton 02186

04

A recent issue of *Vogue* magazine carried a picture and the following short article on our classmate **Katherine Dexter McCormick.** "Mrs. Stanley R. McCormick, frail, brilliant and indomitable, first invested her energies in the leadership of the women's suffrage movement and then in the birth control pill, the one developed by Dr. Gregory Pincus at the Worcester Foundation in Shrewsbury, Mass. That pill or its like has gone around the world, changing the lives of millions of women, millions of families. Mrs. McCormick in 1952 was the only person in this country who gave money for the Pincus work. Money was needed so badly that much of Dr. Pincus' birth control experimenting had almost stopped. Then Mrs. McCormick agreed to underwrite the Foundation's experimentations a year at a time. She still helps support it. Born in Dexter, Mich., the daughter of Wirt Dexter, a Chicago lawyer who organized the relief committee for victims of Chicago's great fire in 1871, she married Stanley McCormick a son of Cyrus McCormick, head of the International Harvester Company. First, however, she was graduated from the Massachusetts Institute of Technology in the Class of 1904. She gave to M.I.T. its first dormitory for women in 1962; recently gave another. In Chicago she gave two courts to the Art Institute; at California's Stanford University she established a scholarship fund for women medical students. Before these activities she was so famous a fighting Suffragette (national treasurer of the Suffragette movement) that during World War I President Woodrow Wilson appointed her to his six member Women's Defense Committee. A few years ago a friend, referring to Mrs. McCormick, said, 'In 215 B.C. Cato the Censor wrote: Suffer women once to arrive at an equality with you, and they will, from that moment, become your superiors." . . . The only other news to report is that **Robert Sosman** passed away recently. He was a pioneer in American ceramics and former professor of ceramics at Rutgers University. . . . We also have a report of the death of **Ralph Ingram**

of Warren, R.I. . . . Greetings for the holiday season.—**Eugene H. Russell, Jr.,** Secretary, 82 Stevens Road, Needham, Mass. 02192

05

The only real bit of good healthy news is contained in a card received from **Lloyd Buell,** which states that he and Mrs. Buell are in good health. . . . **Roy Allen** has been in the hospital for a repair job and again in May-June. Both operations were successful. Hope further recuperation will make you as good as new, Roy. . . . **Herb Bailey** also tells of a couple of operations and reports, "The surgeon who operated on me for the second time said my rate of recovery was so rapid he was sure my biological age was 10 years less than my chronological. I'm back working in pottery a few hours each day and eating many more things than before he did four operations at one time."

I finally located an obituary on **Percy Goodale,** VI, whose death I reported in the last issue. I quote from the Boston *Herald* of September 10, 1966: "Private services for Percy A. Goodale, 84, retired insurance executive and golfer, will be held Wednesday. He died Saturday in his home on Clinton Avenue. Born in Boston, he was graduated from the Hopkinson School, attended Milton Academy, and was graduated from M.I.T. in 1901. He retired in 1946 after 60 years with the Preferred Accident Insurance Company of New York. His last position was Executive Vice President and Manager of the firm's Boston office. He lived most of his life in Arlington. An early tournament golfer, Mr. Goodale participated in father and son matches at the Winchester Country Club for 35 years. He was also a member of the Woods Hole Golf Club. He leaves three sons, Benjamin A. of Manchester, Percy A., Jr., of New York City, and Robert L. of Cambridge." Percy's prowess as a father and son, and grandfather and son, golfer I have reported many times.

The accomplishments and history of **George H. Barrows,** IV, are disclosed in an obituary from the Hartford *Times* through the thoughtfulness of Richard M. Feingold, Secretary of Class of 1943. Again I quote: "George H. Barrows, 85, architect and designer, formerly of 153 Raymond Rd., West Hartford, died Sunday, November 5, 1967, at a local convalescent home. Born in Taunton, Mass., he lived in West Hartford 55 years. He graduated from M.I.T. and was the architect and designer of the Bell Tower at Hillcrest Cemetery, Springfield, Mass. He was also the architect for the Elmwood Community Church and was a memorial architect associated with Presby-Leland Studios, New York City. He was member of the First Church of Christ, Congregational, and was a former deacon, senior deacon, superintendent of church schools and custodian of the church. He was a charter member of the Sam Hunter Bowling League of the church and a member and past president of the West Hartford Public Service Bowling League. He leaves three sons, Jonathan F. Barrows of Madison, Franklin F. Barrows of Sanford, Maine, and Robert S. Barrows of Anchorage, Ky.; a sister, Mrs. Bertha B. Boardman of Taunton, Mass.; 10 grandchildren and eight great-grandchildren."—**Fred W. Goldthwait,** Secretary, Box 32, Center Sandwich, N.H. 03227

07

Early in October I drove with my wife to Newton and called on our Assistant Secretary **Tommy Gould.** We found both Tom and Mrs. Gould at home and had a most pleasant visit. Tom is in good health and does quite a bit of gardening around his house. Due to his operation, he cannot get very far from home base and is fully retired from all business activity. Even with television, radio and reading, he finds the days are long after so many years of a very active life in the construction field. Why not write to him? His address is at the end of these notes. . . . Your Secretary has received the copy of the 1967 Alumni Register which is furnished free to all Class Secretaries. If any of the class members wish information about any M.I.T. graduate, I will give him the latest news as published in this volume of 640 pages. Write me your requests. . . . **Don Robbins,** our Class Agent, has sent out his annual letter asking for your contribution to the Alumni Fund. Before sending in your contribution, read through the brochure that came with his letter and see some of the pressing needs of the campus. I am sure '07 can have more than 59 per cent of our membership recorded as contributors if we stop to consider what M.I.T. did for us. If you know of classmates who do not receive the *Review,* write to me and I will look into the reason. New regulations have been made as to those who will receive *Technology Review.* Perhaps they should be included under these new regulations. . . . **Ellis Doucette,** VI, for many years was a regular attendant at our class dinner in Boston. Then he told us he would no longer be able to attend. He recently wrote to me and gave the reason; his wife who is a diabetic and has very poor eyesight requires his continual personal attention. He is cook, housekeeper, nurse, chauffeur and handyman, for the Doucette household. He enclosed a check for our class kitty with a nice personal boost for the Class Secretary.

I received a nice note from **Jim Barker,** I, in reply to my letter expressing to him the gratitude of the Reunion group for the fine banquet he and Mrs. Barker gave to the Class. He had just returned from a vacation in Scotland, where grouse hunting and salmon fishing had been enjoyed. I am sure many of us wish for the push and drive that Jim possesses. . . . I had a note from **Phelps Swett,** I. He, as usual, sent to me a statement of the Middlebury, Vt., National Bank of which he is President; and I reciprocated with one from the Whitinsville Savings Bank of which I am President. I wrote in earlier notes why Phelps could not attend our 60th Reunion, which he deeply regretted. He reports a good sized building boom underway at Middlebury College where he taught for so many years. . . . I apologize for lack of notes this month; but as I have been unable to write for over three weeks, I will use this as the excuse. I developed "three finger numbness" in my right hand (carpal, tunnel syndrome) and had to be in the hospital and have the nerve in the wrist stripped of its sheath and then put back into place. The operation seems to be successful, as I can now write without pain.—**Philip B. Walker,** Secretary and Treasurer, 18 Summit Street, Whitinsville, Mass.; **Gardner S. Gould,** Assistant Secretary, 409 Highland Street, Newtonville, Mass. 02160

08

Next June we celebrate our 60th Reunion which will be held at the Melrose Inn, Harwich Port, Mass., on the 8th, 9th and 10th; returning to Boston for Alumni Day at Cambridge on the 10th. Ladies are invited. . . . We are sorry to report the deaths of the following members of the Class: **William B. Hunter** of Wellesley Hills, Mass., in June 1967; and **Bradford B. Holmes** of New York City on October 8, 1967.—**H. L. Carter,** Secretary, 19 Woodchester Rd., Wellesley Hills, Mass. 02181; **Joseph W. Wattles,** 3D, 26 Bullard Rd., Weston, Mass. 02193

Col. Willard F. Rockwell, '08 (right), pioneer automotive industrialist, receives the order of Francisco de Miranda from Venezuelan Ambassador, Dr. Enrique Tejera-Paris at the Venezuelan Embassy in Washington. Col. Rockwell, chairman of the boards of Rockwell-Standard Corporation and Rockwell Manufacturing Company, was awarded the medal for his contribution to the industrial and economic development of Venezuela.

09

We have just received from **Tom Desmond** and Alice a copy of her latest book, *Marie Antoinette's Daughter.* In an appended note it is stated: "Circumstances in recent years have kept us from being as often with you and other friends as we could wish. But we trust that the gift to you now of this copy of *Marie Antoinette's Daughter* will help to emphasize that you continue high in the respect and regard of the author and her husband." This is the first time that a book about the daughter has been written by an American, and Alice spent much time and effort in Paris doing the research which was necessary for a detailed and accurate account of the many complex events that occurred in French history during the Revolutionary and Napoleonic eras. The book describes vividly the events of the Revolution during which Marie Therese was the sole survivor of the royal family. As a young girl she was held in jail for three years by the Revolutionists and suffered much before being released. Her life then became a series of harrowing experiences involving international politics and intrigue. With Napoleon in power the royal family became exiles obliged to flee for safety from one country to another. With the restoration of the Bourbons she returned to France and because of her capabilities and personality was instrumental in guiding the restored monarchy through many crises during a most critical period. For 10 minutes she was Queen of France, and Napoleon called her "the only man in her family." Like Alice's former books, this one is not only historically instructive but interesting as well.

A note from the Reverend **Elmo Robinson,** Los Alamos, confirms the statement in the December notes, but in slightly different words, that he is Professor of Philosophy, Emeritus, at San Jose State College and Minister Emeritus at the Unitarian Church in Los Alamos. He adds: "If I can stick it out to 1969, maybe I can finally get to a reunion." . . . A note from Col. **Thomas H. Atherton** from Port Royal Plantation, Milton Head Island, S.C.: "Came here in May 1965; delightful climate, particularly September 1, today; good for golf, boating and fishing." . . . From **Brad Dewey**: "On August 23, 1967, I reached my 80th birthday and I now feel like an octogenarian." . . . From **Samuel McCain** whose address is Syracuse, N.Y.: "Made my first trip out of town since 1961 to attend the wedding of a granddaughter in Cambridge on July 29. Visited for a few days with a daughter in Pembroke, Mass., and with a son in Salem, N. H."

In the October-November notes we stated that **Haylett O'Neill** of Houston, Texas, had been ill for over a year and that we had written to his wife Ethyl expressing our sympathy. She has replied as follows: "Haylett and I both appreciated your letter of October 9. Yes, I do remember you and Mrs. Dawes and your many courtesies to both of us whenever we were able to attend the reunions of the Class, and they stand out in Haylett's memories as do the associations and friends made during his years in electrical engineering, Course VI. Haylett stays much the same as when I wrote before, good and bad days. As to my health, I still have my arthritis and it comes and goes. With sincere and many thanks. Your letter was a bright spot for Haylett."

We were most sorry to receive a note from Doris Nisbet enclosing a clipping telling of the death of her husband, **Lewis Nisbet,** on Thursday, October 12, at St. Petersburg, Fla., at the age of 81. As we all know, Lewis was an active and loyal member of our Class beginning with our student days. He was born in December 1885, prepared for the Institute at the Hope Street High School and the Providence Technical School in Rhode Island. While a student he was secretary and then president of the C.E. Society; a member of the tug-of-war and the track teams; vice president of the Civic Club; a member of the Class Day and Institute Committees. He performed his thesis with **Sam McCain.** Up to 1919 Lewis was employed in New York and Providence and then moved to Maine and established a consulting engineering business in Portland, specializing in surveying. During World War II he was associated with Fay, Spofford and Thorndike of Boston in important projects. He also was in charge of much of the surveying in the construction of the Maine Turnpike. In later years he spent many of his winters in St. Petersburg, Fla. He was a member of Portland Lodge No. 1, A F and M, Scottish Rite Bodies and Kora Temple; was past president of the Maine Association of Engineers. In addition to his wife Doris, a daughter, Mrs. Frank Schell of Acton, Mass., survives. Lewis always retained his interest in the Class, often sending news for the class notes and attending our reunions. He and Doris were present at our 55th at Swampscott, Mass. We have written to Mrs. Nisbet, expressing the sympathy of the Class as well as our own. . . . We also received from the Alumni Office a notice of the death of **Samuel Cabot,** V, on September 8. In 1917 he went to the Plattsburg Training Camp and on March 1, 1918, he became a major in the Depot Brigade, 70th Division of the AEF of World War I.—**Chester L. Dawes,** Secretary, Pierce Hall, Harvard University, Cambridge, Mass. 02138; **George E. Wallis,** Assistant Secretary, 185 Main St., Wenham, Mass.

10

This is the third installment of the returns I received in reply to my request for news from classmates. . . . Mrs. Joseph P. Maxfield writes: "My husband **Joseph P. Maxfield** has been retired now for eight years due to blindness. He has retired three times. In 1947 he retired from Bell Telephone Laboratories in New York. In 1953 he retired as superintendent scientist and technical director of Navy Electronics Laboratory in San Diego. From 1956-59 he was consultant to the chief scientist and acting chief scientist at Pacific Missile Range, Pt. Muger, Calif." . . . **Al Hague** writes: "Obeying that impulse I am happy to state that I am very much alive with all systems still "a ok" ready for the blast off. My hope is that many of the Class are in the same boat with me for the greatest wealth is health for which many in Florida would give all their wealth. Have been commuting between Pompano Beach and Ossining for eight years after having gone south in my cruiser in September '58. In '65 drove to Colorado Springs; in '66 drove to Quebec and Ottawa. Just got back from Shelburne, Vt. Planning to go again to Prince Edward Island. After 31 years I am selling our camp in Ossining. With God willing I hope to make it to our 60th. Since best wishes to all of the surviving 159."

James R. Stevenson writes: "Not much to report to you except that we have sold our farm and now have moved to, and are settling in very slowly, a house adjoining our farm. We are commencing to enjoy some leisure, Auburn Rotary, church, lots of books and papers, plenty of time to talk with our many friends. I now gaze at my apple trees, partly with relief and partly with regrets." . . . **Horace S. Hinds**: "Yes I am still alive. I have been retired here in Maine for the past 10 years." . . . **Carl Doble:** "I understand your task; but as you know, I have been a quiet member of the Class. I retired in '47 and have watched quiet Cape Cod of those days grow steadily into the kind of spot I left (then living on Long Island).I was formerly Vice President of the Pneumatic Scale, N.Y.C. office." . . . **George S. Humphrey** writes: "I retired 16 years ago from Vice President in charge of Engineering and Operation of the Potomac Edison Company. During these years I have had no formal occupation, but have been very busy with various community service organizations. My wife died three years ago. I have two sons and three grandchildren. I am enjoying good health but do very little traveling."

Al Huckins writes: "Happy to report that I am well, happy and busy. Rockport is a delightful town. I am fortunate to have a comfortable home on the shore, and eight of my 10 grandchildren are where I can see them frequently. I average only two trips to Boston each year. I'll do my best to call on you my next trip." . . . **Gordon Hawes** writes: "I have little news. My life is necessarily a quiet one so that the only item I have that might come under that heading is that I spent a month in the

hospital this spring for a minor operation. Otherwise I have kept fairly well for an old-timer (83) and active, all things considered. Like all of us on a moderate income (poor considering newspaper statistics as to what is considered small) I find the fixed income I have being threatened by the politicians' cries for more money to enable them to raise the pay of the 'ins' rather one-sided. It amounts to their wishing us to split incomes that we have to support those whose incomes are already more than we get. Life is sure perplexing." . . .**Curtis M. Hilliard** writes: "I was only a graduate student in Course VII and knew very few people while at M.I.T. I have no news and no one would know me if I gave you an item, but you deserve a signed card."

Clarence L. Jones writes: "Your appeal for live news was forwarded to me at Barnstable, Mass., where, when I retired some 15 years ago, we built a one level house equipped for year-round living. This is the Cape Cod village where I was born and where the summer temperatures are more pleasant than New Jersey. We have 4½ acres with a view of the harbor and where the traffic is no problem. At first we came early in June and stayed until just before Christmas because I did some duck shooting in the fall. Now that I have given that up we stay until just before Thanksgiving and then back to New Jersey for the winter." . . . **Allen Gould** writes: "Thought of you while in Logan Airport returning from a short vacation in Edgartown. Hope I'll have more time between planes next time. Ran into one or two Tech men on the Edgartown waterfront but of a more recent vintage." . . . **Carroll Sutherland** writes: "I am plodding along quietly. Before attending M.I.T. I graduated from the University of Rochester in 1905. Here in Oregon they live longer."—**Herbert S. Cleverdon,** Secretary, 120 Tremont Street, Boston, Mass., 02108

11

A letter from **Paul Cushman** told of the sudden death of his wife, Ottilie, on September 2. Only two weeks before she had attended the 55-year reunion of her high school class in Benton Harbor, Mich. Following an operation for a blood clot in her neck, she died a few hours later from a shock. As has been reported in these notes from time to time, the Cushmans led a very active life right up to this year, traveling all over this country and to Europe with their square dance group. . . . In a letter accompanying a gift to the Alumni Fund Mrs. Roy Seaton told **O. W. Stewart** that **Roy Seaton** has been helpless in a hospital for the past three years. Roy had been a professor at Kansas State College in Manhattan, Kansas. . . . Mrs. Grace Faunce, **Kenneth Faunce**'s wife, died in Owl's Head, Maine, on September 27. . . . Edgar Savage's daughter, Barbara Tappan, sent me the following: "My father, **Edgar C. Savage,** died very suddenly in the Framingham Hospital on July 19, 1967, of cerebral artery thrombosis. Since being widowed 36 years ago, he lived alone in his home in Holliston, Mass. Until he retired a number of years ago, he was employed as a mechanical engineer for Dennison Manufacturing Company in Framingham. As a hobby, in his cellar he had a complete workshop of power tools where he made numerous pieces of furniture for his four children. He also did a lot of work for the Baptist church and other people."

The regular November meeting of the Class was held in the Faculty Club on Tuesday, November 7. Five classmates attended, four bringing their wives. **O. W. Stewart** who is the Class Agent for the Alumni Fund was happy that so many of the Class donated, but he would be happier if the average donation were a little higher. He was looking for ideas for a letter that he has to write which is to be sent out in January. **Robert Morse,** who is now living the year round in Sandwich, made his first appearance at an '11 monthly meeting. He is slowly getting settled in the fine old house that he used, up to this year, only in the summer. **Morris Omansky** talked about a new type of tire that is soon coming on the market. There are two kinds, the belt tire which will cost a little more than present tires, and the radial belt tire which will be considerably more expensive. Either one will wear substantially longer than the present tire but the ride will not be quite so soft. **Suren Stevens,** who is working for the engineering firm that has overall charge of the Inner Belt Highway in Boston, described the project to us. It is a two level eight lane road, partly elevated and partly depressed which leaves the present Central Artery at City Square and goes through Charlestown, Somerville, Cambridge and the Back Bay and South End in Boston to rejoin the Central Artery near the City Hospital. To complete the project will take about 10 years. I was the fifth '11 man and announced that I fully intend to retire next August on my 80th birthday. The ladies present were Margaret Morse, Gertrude Stewart, Ricca Omansky and Alma Clark.

The following information came to me on reply cards sent back by classmates who were unable to attend. **Marshall Comstock** was still at his place in Maine and is planning to spend three months this winter in Florida. He got a deer, not with a gun but with his car! He sent greetings to all. . . . **Eldred Besse** said he and his wife are in average health which means they could be better. . . . **Ernest Batty** could not leave his architectural work at the hospital in Belmont. He did say he would give me a resume of his life, which I shall not let him forget. . . . **Walter Wilson** is still working three or four hours a day for the Wilson Corporation but takes lots of trips to foreign lands. . . . **Edward Sisson** was leaving shortly for Florida. He is still active in business but depends largely on his son and son-in-law. . . . **Maurcie Lowenberg** is teaching a couple of days a week at Franklin Institute and is active on the Brookline Board of Appeals, but gets away for vacations both summer and winter. . . . President **Howard Williams** promised some material for the notes shortly.—**Oberlin S. Clark,** Secretary, 50 Leonard Rd., North Weymouth, Mass. 02191

A reunion memory: five members of the Class of 1912 at their 55th Reunion in Cambridge in June, 1967: Harold G. Manning, Ray E. Wilson, John H. Lenaerts, James A. Cook and Jabez H. Pratt.

12

We are finding it no small task to secure enough material to make a respectable showing of 1912 News. However, we intend to publish every letter received and if there is any delay, please remember that it takes over two months before it can be expected to appear.
We have a letter from **Bates Torrey, Jr.,** outlining his activities since graduation. We quote, "First, I joined a small group for a post-graduate year in Course X, Chemical Engineering. In 1913 I went to work for a large chemical company in Syracuse where I spent nine years in the coke oven division, active in the recovery of by-products from the coking of coal. This required much travel among their 15 plants, largely involving operating and technical problems. In 1922 I was transferred to the alkali division, where the work was almost wholly engineering, including design, construction and supervision. In 1947 I was assigned to special engineering work, prospecting for future raw materials, investigating new plant sites, real estate projects and other interesting business transactions. In 1916 I married Alice, a graduate of Bates College, and our one son is now in business in New York City. I retired in 1955 and plan to spend about five months each year at Higgins Beach, near Portland, Maine. Alice and I have enjoyed most of the five year reunions on Cape Cod with the old gang and were sorry to miss our 55th in Boston. We shall be glad to have any of you visit us here in Syracuse."

I received a most interesting letter from **Charlie Cary** of Wilmington, following his return from his summer home which is located on Pond Island, off the Maine coast, near Milbridge. Several years ago we tried to visit Charlie there, but were

unable to secure facilities to make the eight mile boat trip with the limited time at our disposal. Charlie retired officially nearly 13 years ago from his executive position with Du Pont, but continues to maintain a busy schedule of activities. He writes, "I still retain a couple of corporate directorships, as well as committee memberships in several outside enterprises, involving frequent meetings and some travel. Last year I graduated to Emeritus status on the Bowdoin College Board of Trustees, after many years of close association with the pressing problems of college education, culminating in the National Chairmanship of a multi-million dollar capital drive which enabled me to retire gracefully on a wave of success. I remain firmly convinced that a satisfying retirement should include keeping one's feet in a few puddles and being interested in getting some worthwhile jobs done. As for travel, Frances and I took our last European trip in 1961, when we attended an international conference at Geneva, and included an Austrian visit as well as an auto tour to the Scottish Highlands. Then in 1966 we indulged in the romantic adventure of a long cruise around the Pacific on the Norwegian America MS *Sagafjord*. It was our first exposure to cruise travel, with its highly organized program of social activities and association with a quite different group of travel companions. We had a busy and enjoyable time, made many new acquaintances, and got a superficial look at a large area of the world we had not seen before. The Polynesian hula circuit was a stimulation to our old age! We have two sons, a daughter and 11 grandchildren. The oldest grandson has his A.B. from Bowdoin, a B.S. and M.S. from M.I.T., and is working on Polaris submarines for General Dynamics. His brother has his Bowdoin A.B., and a B.S. from Michigan where he expects his M.S. this year. The third boy is at M.I.T. on the 3-2 year program after three years at Bowdoin. In our daughter's family, the oldest boy graduated from N.C. State and is now an ensign in the Navy Air Force. His next brother graduated from Bowdoin and has just started officers' training in the Navy Air Force. His younger brother is a junior at Bowdoin. Next comes the first granddaughter who is at college in Ohio. The remaining four, one boy and three girls, have not reached the college stage. I should not fail to mention the youngest, a lively four-year-old girl in the one family living near us, who is her grandmother's darling. Keep up your secretarial prodding, Ray, for our group is shrinking and we should not neglect keeping in touch."

Our Assistant Secretary, **Jay Pratt,** writes that they took a trip to Rochester, Minn., last October to get their semi-annual check at the Mayo Clinic, which they passed with flying colors. They went on to Minneapolis where they were royally entertained for a few days by **Willis Salisbury.** He had just returned from a trip through Europe. He has promised to write an article for an early issue of the *Review*. . . . We congratulate **Ken Barnard** who announced the arrival of his sixth grandchild in Okinawa last March. Ken's son is stationed in Japan for the Navy. His daughter-in-law is a teacher in the local high school. . . . **John Lenaerts** writes to tell how much he enjoyed our 55th Reunion last June with the opportunity to renew many old friendships. He says, "The welcome mat is extended to my classmates who come to Florida this winter. I am located at 1101 Harbor Drive, Venice, Fla. 33595." We quote from a welcome letter received from **Aurelius Hornor**: "Replying to your request for news, the most important is that of our 55th wedding anniversary which we celebrated last October 15. In that period we have raised a family of three sons and one daughter. Two of our sons graduated from M.I.T. We are both fortunate in having enjoyed good health and have kept very active. From 1912 to 1920 I was associated with my father in Helena, Ark., except for a brief period of war service, when I served as 2nd lieutenant in artillery, but did not get to go overseas. I shall never know how I would have reacted to enemy fire, probably just as well. From 1920 to 1925 I worked in Atlanta with a close M.I.T. friend who had opened a branch office for a Boston construction company. The 1922 recession brought most activity to a halt and the office had to close, so I was forced to learn what it is to be without a job with a family of five to support. In time apartment building began to boom and I joined a firm of architects. As construction inspector I soon learned that the financing of these buildings was becoming most difficult and I fortunately resigned just before the venture collapsed. Another good M.I.T. friend was just starting a small business in New Jersey, manufacturing oxygen and other medical gases, and I accepted a position as manager. The venture became so successful that it was bought by Thomas A. Edison Inc., and I was soon promoted to Vice President and Division Manager of a larger operation, manufacturing dictating machines; a position which I held until retirement in 1950. We then settled in Carlisle, Pa. where two of my sons had bought a farm. We liked the town and its environs so much that we soon bought some acreage ourselves which was located on the edge of town and built the home where we now live. I had never done any farming or horticultural work, but with plenty of land available I decided to try my hand at growing trees and fruit. Principally by trial and error we finally succeeded and we now have a sizable orchard of chestnut trees, walnuts, filberts, apples, figs and cherries, as well as blueberries, raspberries, gooseberries and currents. When winter comes we often spend a month or more in our home town of Helena, Ark. In conclusion, I think you will agree that the world and its destiny have not been thrown off course by my actions or thoughts. We have had an active and enjoyable life, however, and when the time comes to depart this planet, we hope to do so cheerfully and thankfully.

A most entertaining letter from **Arch Eicher** has been forwarded **Jay Pratt.** Arch says that a real story of his meanderings since 1912 would be a "mission impossible," a statement with which all of us must agree after reading. I have condensed the tale as follows; "With Barry, Gale, Cartwright, and Dad Ireland, I became an efficiency engineer the day after graduation in a shoe factory at Binghamton, N. Y.! However, with the coming of spring the indoors overpowered me and I could not resist the offer of an old friend to become a partner in a contracting business he was starting in the delightful town of Franklin, Tenn. It sounded romantic and would take me out-of-doors! We soon had several contracts, but could obtain no money for our efforts in beautifying the town so had to dissolve our partnership. Next I spent two delightful years in Columbus, Ohio, on a city planning and surveying project after the big flood of 1913. The area included suburban territory, embracing nice peach orchards and ripe vegetable gardens, which I still remember with pleasure. However, I decided to go to Cleveland in 1915 where I was happy with a group of fine engineers, working on a field layout of a new municipal filtration plant. Then came World War I. I cajoled a broad-minded physician to pass me on a questionable eye test and became a first lt. in the army engineers. At Ft. Leavenworth I was asked to take another test, and though I memorized several eye charts, it was no use and I was retired to inactive service. Soon I was working with Stone and Webster who had a contract for building the Ordnance Base Depot in France, and I was shipped over with the first gang. Then followed 13 months of interesting and exciting experiences, a number of which I have written up with photos for my two grandchildren someday to enjoy. In 1919 they sent me to their Cleveland office and I was soon supervising a refinery construction job in Shreveport, La. Then in 1923 I began work with the American Construction Company who were later absorbed by Merritt, Chapman and Scott. Since then and until retirement at age 75, I have been happy planning, figuring and trying always to meet the challenging problems of marine construction along the Great Lakes. This is my life! But oh, what I left out! There have been many near misses but always happy endings. My life has been a wonderful one of living with my loved ones and the many good friends I have had.

Although the leaves are just starting to fall in Swarthmore today, by the time this is published we expect to be enjoying our usual winter visit in Florida, and Jay should be at his winter home in Acapulco. We have both been pleased at the responses to our letters and believe you must be enjoying them as much as we are. If so, please send us your own story even if you have not yet heard from one of us.—**Ray E. Wilson,** Secretary, 304 Park Ave., Swarthmore, Pa. 19081; **Jay H. Pratt,** Assistant Secretary, 937 Fair Oaks Ave., Oak Park, Ill. 60302

13

We are on our way. The returns from dues bills sent out were very gratifying. Nearly a 100 classmates have responded. Another 10 have either departed from this life or have moved without leaving a forwarding address. It is also enlightening that almost 60 persons in cluding wives or members of our families, expect to attend our 55th Reunion and 20 others hope to join us at the festivities. Time marches on. Only five months more and we will be packing and preparing to join for our 55th Reunion on the Cape. . . . It is with a very heavy heart that we report the passing on of several classmates: **Edward Hubbard, David M. Young, Alexander C. Besosa, Edward L. Wadsworth,** Professor **Clinton E. Pearce** and **Percy G. Whitman.** If anyone of our classmaes can provide further details we shall gladly impart such information in our notes. . . . Three envelopes were returned due to change of address not on record with the postal authorities. We need assistance in locating: **Murtha P. Quinn, Henry M. Caswell** and **Louis C. Rosenberg.**

The Alumni Fund Committee has forwarded a few messages from several of our classmates. **Stanley W. Parker** records a brief note, "Married, no children; activities: travel, lawn bowling, bridge, reading; health: good." . . . **Fred Lane** writes: "Dear Phil: During June and July we had a pleasant trip to the West Coast and back. As we had driven West before there was almost bound to be some repetition but that was all to the good. Who objects to seeing for the second time such places as the Black Hills, Yellowstone, the Tetons, the giant redwoods of California, Mt. Ranier or the Glacier National Park? It was a very thrilling trip and we hope to make it at least once more." . . . **E. Dana Pratt** has returned to the fold and he narrates some new educational ideas: "I have carried on some research comparing the U.S. educational systems with those of other English speaking countries, visiting all over a five-year swing from Frisco to Melbourne, Canada, Sidney and others. Class of '13 men should work toward a composite five-year high school course, encourage nursery preschool groups and try to have M.I.T. create a novel five year C.E. Course leading to the Metropolitan Design Engineer Degree requiring three-five years outside independent productive practice before the M.D.E. degree is awarded. These are only the highlights." . . . Happy New Year. More news next month.—**George Philip Capen,** Secretary and Treasurer, 60 Everett Street, Canton, Mass. 02021

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Along about November 1, we usually receive a note from **Thorn Dickinson** to the effect that he is moving back into New York to the Hotel Woodward for the winter. We have assumed that his spring-summer residence was a nice suburban place perhaps a little too far from town to enjoy the benefits of the Broadway environment with any regularity. Our illusions about his spring-summer habitat were straightened out by receiving from him a description of his doings complete with a map of his environment, professionally carried out in the best Course I tradition. As a volunteer he is concerned with an area of the Adirondack Region in upper New York State of about 100 square miles, at the center of which is Elk Lake where there is a rustic lodge accessible by a woods road some miles off the state highway. Throughout the area are a few lumbering roads but mostly it is traversed by narrow foot trails that go up and down the mountains. His responsibilities are particularly concerned with one of these trails.

We'll let his letter tell the story. "I am back in civilization for the winter. Just to show you how uncivilized Elk Lake is I enclose a copy of a map I made last year (redrawn from one I made in 1960). You will note that there is a dead end access road and that there are several abandoned lumber roads; eight buildings, (log or frame) constituting Elk Lake Lodge; an observers' cabin (one room); two lean-to's (open side); and away over across the Colin Range on the Upper Ausable Lake, a number of cottages, reached only by foot or by canoe. The Elk Clear Pond Forest Preserve of 13,000 acres belongs to the owners of Elk Lake Lodge; all lumbering has been terminated, and the entire property is protected from 'development' by a covenant with the State. The Adirondak Mountain Reserve of about the same size is equally secure as it belongs to the wealthy Ausable Club, with headquarters at St. Huberts. The State Forest Preserve is 'Kept forever as wild forest land', by a promise of the present constitution. A new constitution due to come up for voter approval next Tuesday contains the identical language used in the present document regarding the state properties. It won't matter how the voters decide; heads the bears and beavers win; tails the automobiles and bulldozers lose. All the properties mentioned above are open to the public, free, no formalities. On the map I have indicated in crayon the 15 miles of trail that I have opened, cleaned and blazed, and with the occasional assistance of other guests now maintain. We have graded two units of path leading out from the Lodge for the benefit of the elderly and the infirm; it is all rapidly fading back into the landscape. The other 13 miles are rough paths through the woods, some along abandoned lumber roads, some following deer runs, and some on new location to suit the lay of the land. All blaze marks are painted, and there are trail signs at all intersections. Every spring I have to replace a few that bears have torn down and smashed to pieces. Several times this past summer I walked out three or four miles, worked four hours with a two blade Adirondak axe, ate my lunch beside a wild and lonely brook, and walked back in time for dinner without seeing a soul. Two weeks ago I went up my Sunrise Trail, 3 miles long, 1600 foot climb, and found the path well worn and in need of but little clearing. But from the summit, looking down on the lake and over to the High Peaks with big storm clouds blowing in, I felt as if I might have been the first person ever to see the wild and rugged region. Elk Lake is a lot more uncivilized than you imagine. I'll be seeing you in Cambridge in 1969. Sincerely, Thorn." And so ends Thorn's story, and perhaps some of you gentlemen who read this may be inspired to help him in a laudable ambition to preserve our natural resources and keep in good health as well.

We attended the first Alumni Council meeting of the fall at the end of October. As usual, Rich was there, also **Les Hamilton.** The subject of discussion was the newly circulated pamphlet on Alumni organization and plans which you all have seen, or if not, you can receive a copy by dropping a note to the Alumni Office. Which leads me to call attention to the fact that you are always welcome to attend these dinner meetings, held normally on the last Monday of the month. The dinner is scheduled at 6:30 and the festivities are over ordinarily by 9:30 so you can get your beauty sleep. By all means get to the affair early. It is held at the Faculty Club, top floor of the Sloane School Building, on Memorial Drive. There is a bar which dispenses adequate refreshments and we guarantee you will meet not only a few of your own classmates but various members from other classes you will know. The seats and lounges are very comfortable. Preferably give the Alumni Office a ring saying you'll be there, but if you don't, its generally o.k. too.

Les Hamilton has shown me a letter just received from **Alden Waitt.** They were classmates in early school days, and the content of the letter is generally of special interest but it did bring out the fact that the Hamiltons celebrated their 50th wedding anniversary in October. The Waitts celebrated theirs in November. The Hamilton celebration on October 6 included a dinner with 40-50 present at the Faculty Club. As we have noted previously Ham, although technically retired, still has an office at the Institute where he assists in the administration of the Chemistry Department. His official listing is F. Hamilton, Professor of Analytical Chemistry, Emeritus. . . . And among other notes, Dinny's reputation as a money getter is becoming well known. He is heading up the yearly fund canvass of his church this year.—**Herman A. Affel,** Secretary, Rome, Maine. Mail: RFD 2, Oakland, Maine 04963

15

Happy New Year with the hope that you and your families have all enjoyed a pleasant and comfortable holiday season. Our annual New York Class Dinner will be held again in April at the

Chemists' Club. We'll see you there. . . . After a long absence from our column, **Evers Burtner** writes from Wakefield, Mass., about his interesting and unusual work: "Since 1916 during the summer I have served as measurer for the Boston and Eastern Yacht Clubs of Marblehead, aside from teaching marine engineering at M.I.T. I recently was pleasantly honored for my years of service. This work involves measuring many of the important dimensions of hull, sails and spars of sailing yachts under several different rating rules. In the case of the important Cruising Club of America Rule even the initial stability is tested. The above data is inserted in a computer, (in central and northern New England and eastern Canada) the IBM unit at M.I.T. This results in a rating or number. From such a rating the handicap or seconds per mile time allowance is obtained thus permitting sailing yachts of different size, hull form, sail area and even different rig to compete. Dan Strohmeier, XIII, '34, as Secretary of the Cruising Club Measurement Committee passes on debatable questions arising throughout North America. Aside from measurement work I have contributed articles on marine engineering, and have designed and constructed boiler, steam engine and principal components together with the hull of a 16-foot steam launch. With the steam gear out, it serves as a sailboat. In conjunction with our two-week visit last summer to our daughter's family in Portland, Ore., I attended a steam launch meet at South Pender Island, B.C. Fourteen steam launches and yachts were on hand. Last February Mary and I greatly enjoyed a seven-day St. Thomas-San Juan cruise out of Fort Lauderdale on the S.S. *Atlantic* of the Export Isbrandtsen Line with fine entertainment, menu and agreeable fellow passengers. Ex Marine John Bone, XIII, '41, is engineering head of their new construction." . . . **Sam Berke** is resting easy at his Lakeville, Conn., estate to recover from having been laid up for some time. . . . **Whit Brown** visited **Herb Whitcomb** in Ayer, Mass., where he is recovering from some recent cardiac trouble.

After 50 years of service with Ellicott Machine Corporation, Baltimore, **C. Ellis Ellicott, Jr.,** has retired from active management of the company. Ellis joined the company after our graduation and except for time out for World War I overseas service he has served the company continuously in various positions, including many years as President and Chairman of the Board. Ellicott Machine Corporation, now in its 82nd year, has grown under Ellis' service from 25 employees to 1500, including the plants in the United States and foreign subsidiaries. . . . **Bill Holway**'s firm in Oklahoma City continues its big jobs, including a pumped storage project for the Grand River Dam Authority and a 30-mile turnpike for the Oklahoma Turnpike Authority and a new filtration plant for the city of Tulsa. Bill's two sons, both M.I.T. graduates, are associated with him. . . . **Henry Rossell** was married on September 16 to Mrs. Frances Anderson at Sheffield, Mass. Best wishes to this couple. . . . **Pop Wood,** Civil Defense Director of the Monadnock, N.H., region, was the speaker at an emergency preparedness seminar held in Peterboro, N.H., on November 2. Pop has been very active in this work.

The trek to the sunny southlands has begun. In addition to the permanent residents Everett Brigham, Ken Boynton, Gabe Hilton, John Homan, Bur Swain and George Urquhart; the "snow birds" include Whit Brown, Jerry Coldwell and Forrest Purinton at Naples, Fla., Harvey Daniels at Delray Beach, Boots Malone at Sarasota, Doug McMurtrie, Orlando and Jim Tobey suffering on the Gold Coast at West Palm. Maybe there are other classmates down there. Ah, me! How can you feel sorry for them? . . . **Reggie Foster**'s widow, Jo, writes a warm letter from Lowell, Mass.: "Your wonderful Class letter meant so much to Shirley and me. And the fact that your three friends from Tech came up to the services was just the nicest gesture. Shirley and I are more than grateful. Please convey to them our deep appreciation and thank all the classmates for their wonderful thoughts of him. . . . **Hiram Y. Waterhouse,** V, died October 24 in Kennebunk, Maine.—**Azel W. Mack,** Secretary, 100 Memorial Drive, Cambridge, Mass. 02142

16

Looking forward to more reunions and keeping in mind we are supposed to remember our French, we have an opening message from our worthy President, **Ralph Fletcher:** "As **Kem Dean** reported in the December issue, I continue to keep active. At this time of year the hunting and fishing take a back seat to skiing. As I write this, I have no way of knowing how much snow we will have in New England but whether it be New England or other places, you can be sure that I will be doing my best to get as much time as I can on the slopes, not to mention 'apres ski.' Here is a bit of philosphy which an elderly French Canadian companion of mine expressed following the untimely passing of his wife: 'La vie continue.' This has a particular application in our lives. Perhaps we might apply this to our annual reunion in the sense that although many of our friends have passed on, 'Les reunions continuent.' See you all in June."

And speaking of reunions, **Van Bush** has a thoughtful reminder: "We are all going to miss **Steve Brophy.** We are grateful for him for many things. But one of these is what he did to make the 50th Reunion a model for all classes to follow, dignified but with a fine touch of humor enjoyable to all." In reference to last June's 51st Reunion, Ralph's letter, transmitting a copy of the reunion picture to those who attended, noted: "This was perhaps one of the latest pictures taken of our good friend Steve Brophy. We certainly will miss him."

We have news scouts all over. In early October we received a clipping from **Mac McCarthy** of Greenwich with the note: "In perusing the New York *Times* I noticed that **Walt Binger** is given honorable mention on the editoral page." And then **Jap Carr** in Buck Hill Falls, Pa., sent along a like clipping of the October 3 editorial "in case you did not see it and the reference to Walt Binger's work." The editorial relates to the cross-town highway and says in part: "A practical design for the much-needed Lower Manhattan Expressway has at last been worked out by the city and tentatively approved by the federal and state agencies that will pay the bulk of its cost. It should provide great relief to the terrible traffic congestion in the lower part of the city by taking thousands of trucks off congested streets: and it avoids the disastrous elevated structure originally proposed. . . . The plan now proposed is an ingenious engineering refinement and adaptation of the plan first worked out for the Regional Plan Association by Walter D. Binger. In some sections there would be space for parking or industrial development on an intermediate level above the roadway, while the street level was devoted to a park. By the use of Kenmare and Broome Streets as service roads and by constructing one part of the roadway as a tunnel under the Sara Delano Roosevelt playground, the new expressway will minimize the dislocations of residents and businesses."

Going back to reunions, **Howard Claussen** gave us a bit of a jolt in October when he wrote: "Of interest to the many '16 men who have attended our 5-year reunions at the Oyster Harbors Club in Osterville is the announcement that the Club is to be demolished for economic reasons. Plans are to replace the not-too-old, multi-story building with a complex of three or four modern country club style buildings with only about 10 guest suites." Howard added: "Friends of **Lawrence H. Delabarre** would give him a big uplift by dropping him a post card once in a while." (His address is: Walsh Home, 420 East 59th Street, New York, New York 10022)

For our reunion bulletin board next June we have a good picture of **Spotts McDowell** who was honored last spring by his election as an honorary member of Technical committee C-8 of the American Society for Testing and Materials. As reported in the May issue of *Burns and Mixes*: "Mr. McDowell was one of the early members of this committee which has been continuously active since 1914. Its assigned role is the formulation of specifications, methods of test, and definitions relating to refractories. Each year these materials are published in book form. At present the committee is comprised of about 100 members representing manufacturers and consumers of refractories, as well as those who study refractory materials in research institutes and in

university and government laboratories. Mr. McDowell, Harbison-Walker's first director of research and longtime consultant to our presidents on scientific matters, is retired and lives at Hotel Webster Hall in Pittsburgh. His co-authorship (with W. F. Rochow) of the several editions of the book *Modern Refractory Practice* was a major contribution to refractories technology. He served on Committee C-8 during the period when such internationally known methods as the panel spalling test were being divised."

Herb Gilkey, retired professor of Iowa State University, who "only rarely reads a book," reports that he did so recently. The book was *When M.I.T. Was Boston Tech, 1861-1916* by Samuel C. Prescott, '94, Technology Press, 1954. Herb writes: "Doubtless many of you did read it. I hope so. But for us laggards it should have been made required reading as a prelude to the 50th Reunion in 1966. Had it been written specifically for us it could not have been more apropos. Our Class happens to occupy a unique spot in the history and destiny of M.I.T. and in faithful narrative form that fact is unconsciously highlighted. Trite but still true is 'better late than never' and I promise that fellow deliquents will find that the recital of the facts as we lived them, and the renewal with the professors as we knew them, will out-fascinate a paperback western. Health at 77.6 (July) continues top. As one who has never owned a car, the daily morning-evening office mile (each way) seems to be about right. Am on my own and accomplishments are certainly not impressive but the office sojourn does serve, perhaps, as a bulwark against undue wifely domination. In the regular perusal of the class notes I am always impressed with the wholesome volume of truly interesting material contained therein. You are doing a splendid job as a gentle but effective prod."

From **Rudi Gruber** we have October apologies for "typing errors—writing with left hand on my Smith Corona electric because of injury to my right wrist while in the garden." But it reads quite clear: "First of all, many thanks for the nice 51st reunion picture, saddened though by memory of our dear Steve! Since we saw each other at the Chemists' Club, I have been in Europe again, for a 'quickie,' Italy and Germany. Returned in time for the M.I.T. Development Committee Meeting, followed by a Student Aid luncheon next day. On October 11, I attended the wonderful Philharmonic Concert at Lincoln Center; met many M.I.T. bigwigs and old friends. Hope all is going well with you." . . . We have duplicate warm reports from **Cy Guething** and **Phil Baker** of the "big and impressive" October 6, 50th wedding anniversary party of Ethel and **Spencer Hopkins** in the Orchard Lake Country Club (in the, we are guessing, Bloomfield Hills, Birmingham, Mich., area). Four '16 couples were there including the **Gene Barney**s. Cy reports there were over 116 guests and that they took over the entire club. After cocktails and a delicious dinner, there was dancing to a five-piece orchestra that included three beautiful young peppy violinists. Cy says Gyps says, champagne flowed in a deep river at the party. On December 19 Cy and Gyps start their winter plans with two weeks at Key Biscayne. From then on they may be wanderers with possibly two weeks at Pink Sands on Harbour Island. "And all this is part of a grand plan to be in shape for the 52nd in June." Phil and Thelma hope to go on a Caribbean cruise and to Peru late in the winter. Phil speaks of the "crazy riots" in Detroit in July. "They burned fine stores and apartment buildings, there being no such thing as a ghetto. I find this to be absolutely without reason or sense."

There was another 50th wedding anniversary in August—that of Lois and **Charlie Lawrence.** The old folks meant to have a quiet family and close neighbor affair, but visiting grandchildren and children had other ideas. We understand they made signs and posted them up the street in Kingston, Mass., that read: "Help celebrate golden-wedding! Blow your horn 5 yards! Just married 50 years!" So there was much horn tooting all afternoon and evening by former pupils, friends and neighbors. In another vein Charlie notes: "Recently we missed a call from **Henry Shepard** returning from an antique car meet on the Cape where he exhibited his Chalmers. Too bad, for all '16 men are precious friends." [That reminds us, back in something like '07 or '08 we built a racing gig, with fancy steering, that was loudly labelled 'Chalmers Detroit'!] Then Charlie writes about the old summer camp: "When Lois and I went to Machias, Maine, for the committal service for her mother, I had a chance to visit the old surveying camp at Gardners Lake, Technology, Maine. It has been sold to private hands, and after many years was run-down and neglected. However, the lake shone in placid warmth in the sunset glow and raised nostalgic memories of the student gang, Hovey and Jack Freeman, Chuck Loomis, Rusty White, Ralph Fletcher, and Dean Burton, Professor Hosmer and Charles Breed, Russell and the rest. We couldn't enter the buildings but peeked through windows to see that the big drafting tables and most of the furniture were gone. The old gas-electric power plant was intact but the big steam tables and stoves were gone. However, in the main assembly hall the huge fireplace built of field stone with its huge 'T' built into it was still there. Also the old piano with the big red Tech seal was there—it is the one used by our Cuban student **Gustavo Saladrigas** when he sang opera selections so thrillingly in the evenings between supper and study hours. It had been brought to camp from the Union. Too bad the piano had been left, it was such a happy feature uniting our Tech years with warm glowing memories for so many classmates. It could have been a brown mood, but we still have our reunions and Class reports in the *Review*!"

Hy Ullian keeps what he calls "somewhat active" in his aerial and ground survey work. Says he has cut down on the amount of time at work by being on the Cape in the summer months in Bal Harbour, Fla., about two weeks every month during the winter. He notes that Frieda is serving on the Massachusetts Board of Higher Education "which is only 20 months old and is having the customary growing-up pains and all its problems. Their son, Joe, is on a leave with the National Science Foundation "and is currently in Southern California where he is attending special colloquia in his particular field of foundations of mathematics." . . . Via **Jim Evans,** who continues to handle the job of notifying you of the dates of the monthy Class luncheons in New York, we have a letter from **Don Webster** with a clipping picture of **Bill Drummey** that reads: "Report on Vietnam—Marine Corps First Lt. Fitzgerald just back from fighting area, and William W. Drummey, incoming commander Crosscup-Pishon Post, American Legion, are pictured when Fitzgerald was guest speaker to the post at Hotel Vendome." Don writes: "Here's a recent shot (September 26) of Bill Drummey. Once a year maybe I run into him somewhere. Still active in architecture." Then: "Just spent a week in Boston, an apartment at Berkeley and Commonwealth. Wandered all around Copley Square, Trinity Place, and all. Not a stick or stone left of our old stamping grounds. Used to see the entrance curbstones of Pierce Building and Engineering A and B but even They're pulled up now."

Looking to the West, we have had word from **Stuart Keith** in Denver who says he and his wife have both been adding to medicare bills. They have four grandchildren in college, "Colorado, New Mexico, Massachusetts and Virginia, and two more to go in next fall. We hope by next year we will be in 'operation' and possibly have a trip East. Of course a 'machine' that is 75 years old is impossible to keep in good repair. However, Denver is one of the leading centers for 'transplants.' So, if we can hold on for a few years maybe we can get a lot of replacement parts." . . . In October the **Joel Connolly**s wrote from Kansas City where they were visiting Virginia's twin sister and were about to go home to Tucson for the winter. Last June we had a copy of the Connollys' own now-and-then publication, *The South West News* on the bulletin board at the reunion, and we hope they will attend the 52nd next June to see just how we do it. . . . Ann and **Will Wylde** of Stamford, Vt., plan to spend their winter in Anna Maria, Fla. They enjoyed last winter in Tucson, especially, they say, with such fine people as the Connollys only 30 miles away. Will notes: "Incidentally on our way

home we saw a very convincing reason why **Francis Stern** loves Palm Springs. We left L.A. on a cold and very rainy morning about mid-April, in fact there was snow in the surrounding mountains almost down to the road level, but about 20 miles or so from Palm Springs we came out into the warm bright sunshine, a terrific contrast, almost unbelievable. I can't give you any gems of philosophy—I don't seem to have any except to stay alive!" . . . Our only Indiana '16 man, **Ed Hanford,** sends thanks for the picture of the 51st Reunion with : "Almost as good as being there. By the way, the only drinkers evident are **Len Stone** and **Ralph Fletcher.** They are well preserved with all their hair, don't wear glasses and have beautiful girls with them. Draw your own conclusions. I have to have a double martini before dinner." . . . Moving southward to Tryon, N.C., we hear **Allen Pettee** asking why we don't have a zip code on our letterhead. Economy, just plain old New England economy—using up the old stationery before we buy new. But we do have new stationery on the way, Allen, and mit zip code. He answers one of our perennial questions thus: "Been doing? Just so that we will re-appreciate the old homestead we have had a couple of good trips this year, one for two weeks in Mexico during which we explored rather thoroughly the Mayan ruins in Yucatan, the Mayan (?), Toltec (?), Mixtec or Zapotec ruins around Oaxaca, and some of the Independence Territory north of Mexico City. In admiration of the Mayan calendar and numerical system (they invented the zero independently, it is said), I studied it a bit and now can multiply and divide in their dot dash zero vigesimal manner." [An example please, for this column!] "Square root is less easy. After using the summer for recuperation from the Mexican jaunt, we wound up the vacation period with a few days at Ocracoke on the No. Carolina Outer Banks. If you like to fish and especially if you like to eat bluefish, there is no better place along the Virginia, Carolina shores. Busy right now cutting back the 'jungle.' Our originally modest little shrubs have just about taken over."

From Charlottesville, Va., **Wes Blank** writes that to travel three high-speed turnpikes for 500 miles to Cape Cod precludes their attending every annual reunion. While the 51st was going on they "were away for seven weeks touring Portugal, Spain, French Riviera at Cannes, Northern Italy, Switzerland, Liechtenstein and Austria. This coming 1968 summer we hope to visit the National Parks, Vancouver, Lake Louise and Canadian Rockies if our health permits.". . . Until their permanent new home is ready for them in Silver Spring, Md., next March, Mary and **Bert Ellis** are living in the Governor Bradford Motor Inn in Plymouth. From there they take frequent trips to visit their teaching daughter at Wellesley and spend time genealogically in the library of the Mayflower Descendant Society. . . . **Maury Holland** proudly reports from East Greenwich, R. I.: "Our summer began on an auspicious note. On July 31 our only son Maurice Jr., IV, (in the Boston tradition) was married and held a reception here on the terrace of our 'estate' high on a ridge overlooking East Passage of Narragansett Bay. With a four-day honeymoon at our old stamping ground, Chatham Bars Inn, back to work, then on August 6 off to San Diego. Recently promoted, Lieut. Commander, USNR, M. Holland takes his bride for a three-weeks exercise in Naval Intelligence honeymoon with tab picked up by "Uncle.". . . **Ted Strieby** makes vacation sound awfully good as he reports: "As usual my wife and I spent three months in northern Vermont last summer, with our daughter and her two sons. Our son Mike with his three children were with us for two weeks. Very lively! Many pleasant pastimes—swimming, croquet, some little golf, picnics, etc. Bought a Sunfish (small, fiberglass) sailboat which the young much enjoyed. Even sailed it a bit myself including one stormy day when I tipped over." Ted writes favorably of his two trips to Expo: "The exhibits by many small countries—not present at the N.Y. World's Fair—were easy to get into and most interesting. The Fair's management did an excellent job in layout, transportation and exhibits—way ahead of New York. No consulting this year. I can't keep up, but might join IESC in South America if things down there get more quiet."

The 1916 geographic registers that **Len Best** printed and provided for the 50th Reunion are an important part of the daily life of the officers of the Class. Worn copies are in evidence at the monthly Class luncheons in New York. Len has been ill and is confined to his home in Summit, N.J. A number of '16 men have visited him and **Harry Smith,** who lives nearby in Chatham, has kept in close touch. . . . **Ted Parsons** writes from Phoenixville, Pa.—a warming letter in spite of the arthritic handicap he has suffered since retirement in 1960. "We moved down here about a year and a half ago to be near our daughter, her husband and two children, and their very kindly and heart-warming nearness has done much to contribute to our enjoyment of life under the present set-up. There is much for which we are thankful. Our house which is exactly suited to our present needs and condition, stretches along a fine golf course. This gives me joy as there seems to be plenty of players who are just as lousy as I used to be, and the store of golf balls which turns up in our shrubbery are welcomed by our grandchildren, if their rightful owners escape our attention at the time of their ineptitude. . . . For anyone who thirsts after news from me, please give them my assurance of regard and best wishes for the future." . . . From West Hartford **George Petit** sends a goodly message: "Just say for me that I wish the best of health and happiness under the circumstances for all members (and their little ladies) of our great Class of 1916. As for my little part, continued study and research in mathematical statistics makes existence bearable after 10 years of retirement."

In closing let us note how welcome you would be at any one of the monthly Class luncheons (joint 1916-1917) at the Chemists' Club, 52 East 41 St., N.Y.C., at noon on the Tuesday following the first Monday of each month. In October nine were present including '16 men Caldwell, McCarthy, Stern, Stone and Dodge. . . . Letters from **Dina Coleman, Barney Gordon** and **Robert Kallejian** will be reported in the next month's column. And now keep your two little old secretaries busy and happy and always just a little behind by writing a little but writing often news, learned comments or philosophy. And best wishes from your officers for a happy and healthful New Year—**Harold F. Dodge,** Secretary, 96 Briarcliff Rd., Mountain Lakes, N.J. 07046; **Leonard Stone,** Assistant Secretary, 34-16 85th St., Jackson Heights, N.Y. 11372

17

Happy and healthy New Year to you one and all! . . . **Bill Denmen** reported: "We spent New Year's 1967 with our son in Washington last year and then started for New Orleans, via Florida, and had a very enjoyable visit with classmates **Ray Stevens** and **L. E. Schoonmaker.** At New Orleans we took our car with us on a United Fruit Company freighter for Puerto Barrios, Guatemala, with a four-day stopover in Jamaica so that we were able to do some sightseeing there. We spend the first weekend in Guatemala at the United Fruit Company plantation at Bananera and then to Guatemala City where we were entertained by Mario Wunderlich, '45, and Rodolfo Andrade, '52, and other old-time friends there. We again made a trip to Tikal to see the progress being made in uncovering some of the magnificent Maya structures there. We drove to Mexico over the Pan-American Highway and found that an American contractor was paving the unfinished portion and maintaining traffic so that we had no difficulty. We stopped for a few days at Oaxaco, as usual, and found it as enjoyable as ever, then on to Mexico City to visit with C. M. Cornish, '24, and attend the Fiesta—our 11th one. Our Class was well represented by **Al Lunn,** the **Robert Erbs,** the **Dick Lyons** and Conchita. It was a wonderful party, and those who have not attended the Fiesta are missing a lot. After resting a few days after the busy days of the Fiesta, we started north and visited along the way. One stop was with **Walter Pond** in Malvern, Ark., and another with our son David, M.I.T. '54, in Indianapolis to see our youngest grandson, now four months old."

I. Edmund Waechter now of Hollywood, Fla., comments, "A few short months ago we had the great pleasure of celebrating the homecoming of our son Bill from Vietnam. No, he did not come empty handed—among other things his reminiscences of a few narrow escapes, which together with his crew and God's help he managed to survive. His co-pilot and two crewmen have been awarded Distinguish Flying Cross medals and our Bill, Lt. Wm. Waechter, U.S. Naval Reserve, the Silver Star Medal. Bill has been in the Navy since graduation from the University of Florida in 1961. He received wings for flying practically everything that can fly. For the past two years or so he has been specializing in helicopters, the large ones, hence his service in Vietnam. He will be called up again and will be leaving in a couple of months, August or thereabouts. May the good Lord help him to rescue more downed pilots and help him to come back safely to us.". . . **Paul M. Flagg** of Chicago, "I was lucky enough to be in Florida all last winter and to completely have missed Chicago's big snow." . . . We missed you, **Ed Tuttle,** at the 50th, and appreciated Maggie Tuttle's note, "Ed is still vegetating in New Hampshire, not doing much but contended and comparatively well."

Dick Lyons commenting on their trip last spring to Mexico, "As to **Luis J. Bacardi,** his name appears on the 1917 roster which is dated December 8, 1966. I did not meet him in Mexico. As a part of our entertainment at the Fiesta there was a trip to Teptzotlan, a colonial town north of Mexico City. On our return the group was invited to stop for refreshments at the Bacardi plant north of Mexico City. This may be where your friend Clark, possibly '21, [Carole A. Clarke, Secretary of the Class of '21] met Mr. Bacardi whose address on our roster is Havana, Cuba. Incidentally the stop was very rewarding. **Penn Brooks** and party came into Mexico City after the Fiesta and later we had a very pleasant dinner and visit with them at Chichen Itza in Yucatan. The Fiesta was very well done and we hope to return in '68."

Carle Adams of Providence, R. I., writes, "I am still working but looking forward to retiring one of these days. I am still with what used to be Fruit of the Loom, but now is Pontiac Print Works, Inc. If you can get radio station WRIB 7 to 8 a.m. Monday through Friday, I am generally on for a short message every Thursday at about 7:35 a.m.". . . **Ben Lewis** of Tacoma, Wash., writes as of last May, "Yes, 50 years in retrospect do not seem so long. Those were the best years, when I had the privilege of being mates with the Class of 1917.". . . **Win Swain,** formerly a statistician now an analyst, has submitted, as of June 1964, a revised draft entitled, "Forty-Two Years on Wall Street." It is very interesting, Win, and has been finally digested, and more will be forthcoming in later notes. However, it appears you are still working but it is difficult to conclude whether you are on your 2nd or 3rd million. You make no mention of the Gramercy-Cambridge Fund. . . . **Arch B. Johnston** thanks the Reunion Committee for all the literature sent and comments, "My wife and I are not going to be able to attend, but I would like to take this opportunity to extend best wishes to all my classmates for a happy and successful reunion. For the past 10 years we have been spending, January, February and March in Barbados and there have had a very pleasant association with **George Kittredge** and his wife Marjorie. In glancing over the list of class officers, I see that one of them is Peso Moody. I would be glad if you would extend special remembrances to him. . . . **Dick Catlett** following the 50th writes, "Martha and I had a wonderful time at the reunion, and we know how much of its success was due to the committee's efforts. It really is an exceptional group of men and wives that will turn out in such numbers and be so eager to give others a good time. Since our return to Richmond, Va., my company, Catlett-Johnson Corporation, has been busy moving and getting settled in a fine new plant that has been under construction for six months. I am not very active, but still have a small office and a large interest in the operation (air conditioning). It has been wearisome but fun."

Mrs. Wm. Chambers Mehaffey, (Lydia) of Chambersburg, Pa., writes, "The gods seem to be against me. I got through my first winter I stayed north in years, and picked up a flu bug and had to miss the reunion. I'd been looking forward with much pleasure to being there and seeing Pott's friends. I am planning on going by steamship, *Orsova,* P&O Orient Lines, to Australia to see my daughter and family for Christmas, then on to Djarkarta, Indonesia, with them for a visit. I could not work out a freighter trip so planned a sea-air trip. I think I would prefer a freighter since I will have to travel alone. However my return trip is open so may be able to get a freighter to Penang and on through the Suez if the fighting over there has ceased. I enjoyed the letter signed by the '17 members at the Reunion.". . . **Edward B. Payne** advises those flying to Washington, "The College Park Airport is about a 10 minute walk from our house; food and drinks are awaiting and we can settle a few of the world's problems. If you land any other place, our telephone number is 277-0412. I am still working for the Department of Defense full time." . . . **Frank L. Butterworth, Sr.,** of Marion, Ind., reports, "Helen and I had been looking forward to attending our 50th for quite some time, but some major surgery on May 10 precluded our getting there much to my regret. I surely did miss seeing some of the classmates whom I knew personally way back yonder.". . . **J. Raymond Ramsey** toured the northwest U.S., Canadian Rockies and had a boat trip on the Inside Passage to Shaguey, Alaska, and visited 23 national parks and monuments."

Joe Littlefield and Doris had expected to be at the 50th. However they did not make it for both of them were summoned to Orlando to take the Real Estate Licensing Board examinations. It was quite an experience, but Joe has no doubts as to the successful results. Does this mean in passing the tests or selling real estate? . . . We have a report that **Dusty Wilson** left Cambridge after the reunion minus one shirt which he did not expect to lose at a class reunion. Apparently the Institute Patrol located it and it has since been mailed to him. . . . **Dick Whitney,** [president] pilot of the Early and Pioneer Naval Aviators Association, took in their reunion at San Diego and then was off on a 30-day cruise to Europe. . . . Col. **W. L. Medding** of Springfield, Va., writes, "All of you who were involved in the arrangements for the reunion deserve much thanks and appreciation for the excellence of the whole affair. We all felt that way, whether any of us said so before we left Boston or not. . . . One of our two honorary members of '17, President Howard W. Johnson, writes as of September 12, "It is a great pleasure and honor for me to be associated with the Class of '17 and I look forward to many more meetings." . . . The M.I.T. Alumni Center of New York opened its fall program with a special concert of the Festival Orchestra of New York at the Philharmonic Hall, Lincoln Center, honoring our honorary member, Dr. James R. Killian, '26. Jim was presented the Bronze Beaver Award with an excellent citation. This indeed was an auspicious occasion with M.I.T. Alumni and guests filling the entire Hall. . . . This brought the **Walter Beadles** from Wilmington, Del., the **Lunns** from Cambridge, the **Erbs** and **Tarpley** from Connecticut, along with our honorary members President Howard Johnson and Don Severance and their wives. Our thanks go to the group of underwriters.

The M.I.T. Club of Northern New Jersey on November 9 started their fall program with a well attended dinner meeting at the Orange Lawn Tennis Club in South Orange. A most interesting address was given by Mr. Herreshoff of M.I.T.'s Department of Naval Architecture and Marine Engineering on the subject of sailing yacht research and why America always wins the America's Cup. Already challenges from Australia, France, West Germany and Greece have been received for the 1970 race. Present were **Ray Brooks,** recently returned from Hawaii and the Alumni Officers' Conference at San Francisco and the **Proctors**. . . . The second gathering of the M.I.T. Alumni Center of New York on November 2 featured a most interesting address and discussion by Mr. Seymour Topping, Foreign News Editor of the N.Y. *Times,* on the subject of China and South-

east Asia. For those who missed his message, maybe they saw Mr. Topping on Channel 13 on TV the following week. He was interesting and informative. . . . Mrs. Win McNeill (Carolena) advises of a new address namely, Avery Heights, 705 New Britain Ave., Hartford, Conn. 06106, and comments," I love the friendship circle pin sent me and I want to thank you all." . . . Winter must be with us. The Grand Curling Club of America published last fall a scholarly, anniversary edition of it's annual publication. This being the 100th year of organized practice of the particular form of addiction known as curling, the compilation of a century's records of social, travel, gastronomics, and even athletic events, became an important matter. It was delegated to a committee of the best informed, and most extensively experienced curlers in the whole network of the rinks. **Lucius Tuttle Hill,** one of the grand old men of the so-called game, actually a disease, served as chairman of the committee and spent the last summer creating a masterpiece of meticulous recording, and an interesting, illustrated historical anecdote and story. His own portrait as historian since 1954 lies tucked away in the middle pages. He is reported officially in excellent health as he is about to embark on another season of national and international participation of matches and bonspiels."

The October Alumni Council meeting saw six '17 blazers worn by Al Lunn, Brick Dunham, Stan Dunning, Stan Lane, Tubby Strout, and Don Severance. Naturally they attracted considerable attention and added color to the meeting which Al Lunn ran capably as Chairman of the Long Range Planning Committee, a job which has taken a lot of time and energy on his part. . . . **Charles M. Black,** 650 Ash St., Denver, Colo. 80220, has been reported deceased. . . . Professor **Po Yuan Hu,** PO Box 333, Kuala Lumpur, Malaysia, has already responded to the 1967-68 Alumni Fund. How about that? Are you still teaching at the beautiful new university on the left before entering Kuala Lumpur? . . . Address changes: **L. I. Dana,** 180 East End Ave., New York 10028; **Alfred S. Niles,** Casadel Ray, Santa Cruz, Calif. 95060. . . . Due to election day falling on a Tuesday, the November luncheon of the New York Tech Club, '16-'17 group, was held on the following day. Attending were seven '16 men and three '17 men. . . . **Dick Loengard,** who deserves honorable mention for a perfect attendance record, looked 10 years younger according to **Bill Neuberg** who had not seen him since Dick's surgery in August. Could it be the excellent Welsh rarebits and martinis? The beaver tie referred to in the *Reunion News* is a cardinal tie with small grey beavers and is available through the Tech Coop.—**C. Dix Proctor,** Secretary, PO Box 336, Lnicoln Park, N.J. 07035; **Stanley C. Dunning,** Assistant Secretary, 6 Jason St., Arlington, Mass. 02174

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It is not an overheating of the imagination which creates something special between college classmates. It is not that they have taken the same courses, roomed in the same dormitory, belonged to the same fraternity, been certified by the same faculty and at last belong to the company of educated men. It is not because they see each other seldom after graduation that friendships are knit up so spontaneously at a reunion. Perhaps it is because college is for people with ideas and a capacity for taking responsibility and who possess some common ground of interest. These are the cutting edges of real friendship, and we are about to experience them once more. . . . A card from **Pete Harrall,** postmarked Amsterdam, says, "Frances and I are taking a well earned, eight-month trip through Europe this winter, returning in time for our 50th Reunion. We bought a car and are seeing all the countries we want to see, and in the places we want to look. This leisurely way is great. We recommend it. We also look forward to June and hope to be there with bells on that will tinkle in the long corridors of 1918 history." . . . In September **Bill Jones** (122 So. 39th St., Omaha, Neb. 68131) sent the *Review* a manuscript entitled "Life's Deeper Issues." The editors passed it along to this column. He says, in part, "Our superb productive ability pales in the darkness of accelerated change, confusion, and crises. How utterly incredible! How unexpected and bewildering, for indeed we've been but filling need and abolishing scarcity. What could be more natural and worthy? But as we ponder, we're gripped by the inexorable truism of the old proverb, 'Anything carried to an extreme tends to become its opposite.' Are we trapped, seduced into putting productive ability before social responsibility and service, blinded to life's deeper issues? No! a thousand times no! We stand today second to none in education, training, employment, pay, health, wealth. Our very name stands for high standards, individual responsibility, freedom. We're striving relentlessly to share our blessings. We're helping others to self-determination based on literacy, understanding, virility, competence. We're helping others to freedom, to security against terror, destruction and war. We're rooting out the remnants of poverty, riots, slums, adult delinquency, apathy, religious intolerance, accidents. We're improving cities, looking ahead, anticipating social and economic problems, holding solutions in readiness, preparing follow-ups, learning better the art of sharing, giving, helping. We're reaching for quality, meaning and purpose, respect, not riches, creators and participators, total fellowship honoring creation for what it adds to understanding of race. We are thankful that amid the noise and tumult of each bearded peacenik, 1000 young Americans enlist and quietly offer their lives. We are proud that the skill, valor, leadership and all-around success of our Vietnam Negro combat troops is proving there is no color in war. Let us keep ever alert to the importance of service over brute power, heart over intellect, the whole over the part. Let us continue to apply our God-given inner spirit in prayer and in action to what we believe in and live by and die for; continue to let each bump and knock impel us the more to uphold the freedom, peace, and security of every individual of every nation."

In a strong and solid way the ebb and flow of life is continually dispelling any drabness, and sometimes doing it with a surprise. This has happened to me twice in recent months. First came a column called "Maggie Says" in a trade magazine called *American Hairdresser.* It begins like this: " 'In any area where he has real ability, unimpaired by disturbed emotions, a man's urge to perfection is instinctive,' says **F. Alexander Magoun,** former Professor of human relations in industry at the Massachusetts Institute of Technology." If I remember correctly that was in a book called *Successfully Finding Yourself and Your Job* Harper published for me in 1959. A more disconcerting but equally surprising experience among life's complex, unexpected and exhilarating moments, came at a recent faculty meeting when the dean called me to the platform and read the following as the president made the presentation. "F. Alexander Magoun, educator, counselor, and author; champion of academic freedom and honesty; needler and watch dog; friend and strong supporter of Franklin Pierce College; the board of trustees, through President DiPietro, takes pleasure in giving you this plaque in recognition of your contribution as a Founding Fellow." Did you ever have the thrill of feeling you have surpassed yourself?

Our 50th Reunion is only half a calendar away. Time never loses its pace nor its direction. It knows no way to tarry. We are all carried along in the unwinding of its measured, endless cable. How many of us will gather in June to find out where we are in the timetable of our lives? . . . Two more who will not be there are **Bill Weber,** IV, 3104 East Anyx, Phoenix, Ariz. 85028, who died on August 29, and **Alfred Evans** XV, 65½ Edgewater Drive, Dunedin, Fla., who died on September 24.—**F. Alexander Magoun,** Secretary, Jaffrey, N.H. 03452

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The 1919 dinner in New York City, mentioned in last month's notes, was held at the Roger Smith Hotel at 47th & Lexington Ave. on October 17. **Paul Sheeline** came down from Boston. He is chairman of the 50-year gift

to the Institute. **Will Langille,** our 50-year Reunion Chairman, was present and is getting things rolling for the 1969 June activities. **Don Way** our Class President was there, and so were **Buzz deLima, Leo Kelley, Jim Strobridge, Phil Rhodes,** two from M.I.T., Ken Brock and Roy Johnson and your Secretary. The evening went fast. Plans were discussed for the big 50-year reunion, and I am sure news will go out shortly. Ken Brock wrote me the dates: Thursday, June 5, 1969, reunion starts at the Institute; Friday, June 6, commencement, leave for the Cape in the afternoon, spend Saturday and Sunday a.m. there, and then return to M.I.T. Sunday. Activities there continue through Alumni Day, Monday, June 9. I am sure this reunion will mean a lot to us all and will be well attended. . . . **Ralph Gilbert** has been retired nearly seven years. He spends spring, summer and fall at Point Lookout, Long Island, and winter in Brooklyn. . . . **Marshall Balfour** has been retired but does an occasional consulting job for the Population Council of New York. Last January he spent a month in Honolulu while he advised the East-West Centre and the University of Hawaii on their population planning. . . . **Bill Banks** says hi from Rye Beach, N.H.

Lloyd R. Sorenson is looking forward to the 50th Reunion and will take another golfing trip to New England after the reunion as he did in 1964 after the 45th. . . . **Dean Webster** is Regional Chairman of the Alumni Fund Drive for Andover, Mass. . . . We have also heard from **Albert Reynolds** who says he'll see all at the 50-year reunion; **John W. Meader, Howard H. McClintic, Jr., Chas. J. Parsons** and **Ted Shedlovsky.** Your Secretary spent two weeks in Scotland in late September. He was a member of a foursome playing at Gleneagles in the four-ball International Golf Competition. No class notes for February as he and his wife will be in South America for the month of December, traveling alnd spending Christmas with their daughter who is with the Peace Corps in Bolivia.—**Eugene R. Smoley,** Secretary, 1111 Casuarina Rd., Delray Beach, Fla., 33444; Tel: 305-278-4537 from January 1 to April 1

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Class representation at the Alumni Officers' Conference in San Francisco consisted of Mrs. and **George Morgan,** who flew up from Beaumont, and Amy and myself, driving in from San Rafael where we were tending the grandchildren. It was a first class meeting, as always, and George and I had a fine visit. He looks wonderful. The Morgans, first citizens of eastern Texas, continue to lead useful and happy lives. More power to them! George has written me about his visit with Snug Etter which unfortunately I couldn't attend because of the aforementioned grandfatherly duties. George reports that "Snug looked great, has most of his hair, and is not much heavier than he was when an undergraduate." Snug's home is 1835 Willow Road, Hillsborough, Calif. His formal name is Harold P., in case you've forgotten. He is retired but keeps busy with consulting work, golf and general activity. . . . As a result of a mixup at alumni headquarters **Tony Anable** was mistakenly reclassified as a member of the Class of '21. When I quizzed him on this, I got a delightful and spirited response which I know you will enjoy sharing. Tony wrote, "Horrors! Change my class affiliation? Never! 1920 is the Class of my two roommates, **Peter Ash** and **Archie Cochran.** I served the Class as a member of its Executive Committee and captain of the freshman track team." [Tony won his varsity "T" in the 220 yard dash at the N.E.I.C.A.A. meet and claims he still proudly wears his tattered old 1920 red track sweater.] He and **Buzz Burroughs** and **Dan Harvey** spent a week last summer cruising Chesapeake Bay. Says Tony, "Rest assured that, God willing, I'll be on deck for our 50th."

Al Burke got hold of a feature article in the Sunday supplement of the Pittsburgh *Press* dated April 2, 1967, in which **Ted Bossert** was cited as a prime example of achievement in the retirement years. "I woke up one morning and thought, what in the world am I going to do all day ? That's when I knew I had to get moving," says Theodore W. Bossert of Rosslyn Farms, retired Vice President, Research and Development, for Alcoa. Now he has a new title and an assignment that's leading to all kinds of interesting jumping off places. He's curator of portraits at the Hunt Botanical Library on the Carnegie Tech campus. He's up on algologists, bryologists, pteridologists, paleobotanists, micrologists and others in even more complex fields which bear no connection with his own speciality, metallurgy. Ted corresponds with botanists all over the world, has collected thousands of pictures of scientists including some photographs of sculptures dating centuries before the Christian Era. He and his wife travel extensively and now make it a point to look up botanists. While in Europe in 1966 tney spent several weeks at the University of Padua adding to his collection. He's done the same at the University of Hawaii and has worked at the Gray Herbarium at Harvard among many others. Before he gets through, the Hunt Library will become a world center for proper identification of botanists, modern as well as ancient. With all this, Ted still finds time for golf and other social activities and excursions.

Information received at the Alumni Office indicates that the following classmates are deceased although no dates are available: **Marcial E. Martinez** of Santiago, Chile, and **John L. Keats** of Santa Barbara, Calif. . . . The Class continues to be well represented on the Alumni Council which includes three ex-presidents of the Alumni Association, **Ed Ryer, Al Glassett** and the writer. Ed is the Class Representative on the Council, and Club Representatives are **Al Burke** for Charleston, **Perk Bugbee** for Akron and myself for Buenos Aires. Maybe I ought to pay them a visit. **Frank Badger** continues to serve as Regional Chairman of the Alumni Fund for the Ft. Lauderdale area. Write me, will you please?—**Harold Bugbee,** 21 Everell Road, Winchester, Mass. 01890

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Happy New Year! The 1967-68 period is being observed in Liege, Belgium, with various celebrations in connection with the 150th anniversary of the University of Liege. Technology was invited to send a delegate and the Institute chose our classmate, Dr. **Charles L. Manneback,** Professor of Physics and Mathematics of the University of Louvain and an Honorary Secretary of M.I.T. The numerous scheduled events extend over a considerable period to mark the royal decree in 1816, designating the site for a university, as well as the various steps through 1817 and 1818, covering its actual establishment. As of last November 6, Charlie participated in an academic assemblage which conferred an honorary doctorate upon King Baudouin and also officially opened several new university buildings. In addition to his own academic duties, Charlie is the permanent secretary of the Royal Academy of Belgium and President of the M.I.T. Club of Belgium. He makes his home at 27 Rue de la Tourelle, Brussels 4. . . . **Leonard R. Janes** says he is now on the faculty of McKendree College, Lebanon, Ill. 62254. Jimmie writes: "After having retired six years ago as development engineer of Commonwealth Edison Company, Chicago, I have been asked to become visiting professor of physics here at McKendree College and I have accepted. My predecessor resigned to enter upon advanced studies. Although I studied and taught electrical engineering at Technology, my association with Professor Franklin and my later study of physics at Northwestern University will, I hope, enable me to complete the year. It's tough, though. I'm working harder than the students." Jimmie's home address remains 2520 Noyes St., Evanston, Ill. 60201. . . . **Harry M. Ramsay** reports a new retirement address at 10830 Venturi Drive, Sun City, Ariz. 85351. Agnes and Harry had moved to Laguna Hills, Calif., in 1964, when he retired from his own firm, Wholesale Tire and Supply Company, Minneapolis, to indulge in golf and travel. They have three married children and 10 grandchildren.

It is a source of much satisfaction to see the names of a number of members of the Class of '21 on the important Development Committee of the M.I.T. Corporation. Included in this group are Oliver Bardes, Arthur R. Harvey, Henri P. Junod, Samuel E. Lunden and

William J. Sherry. The late Ernest Henderson, Sr., had also been a member of the committee. . . .We had a delightful evening at the buffet and concert for New Jersey, New York and Connecticut alumni at Philharmonic Hall, Lincoln Center for the Performing Arts, New York City, in honor of Jim Killian, '26, President of the Corporation of M.I.T. The only classmates we saw were Dorothy and **Joe Wenick.** As noted last month, Joe is still in Fairbanks, Alaska. As these words are being written in November, the temperature there has already dipped below zero! . . . In a couple of days the M.I.T. Club of Northern New Jersey will hold its third event of the season, a talk on "Why We Won the America's Cup Race," by Halsey C. Herreshoff, '60, of the Institute's Department of Naval Architecture, and **Sumner Hayward** has promised to join us there for dinner to prove that he has fully recovered from his recent surgery.

Maxine and your Secretary have just enjoyed three days with Maida and **Ed Dube** of 216 Woburn St., Reading, Mass. 01867, who stayed with us here in Brielle. We spent one evening in a miniature '21 reunion with our Sea Girt, N. J., neighbors, Alex and **Munnie Hawes.** Munnie and Ed had known each other in Chicopee, Mass., before we all entered the Institute. We explored the New Jersey coastline north to the highest spot on the Atlantic seaboard at the old Twin Lights, or Navesink Lighthouses, on the grounds of which Guglielmo Marconi sent the first wireless message across the ocean in 1907. Mexico and Expo 67, an exhibition with some of Maxine's paintings and the recent trip which Maida and Ed made to Nova Scotia occupied much of our time before our guests left on a trip to historic spots farther south in the Philadelphia area.

Anne and **Wally Adams** wrote that they had a pleasant trip back from Brielle to their home at 2606 Fleming Rd., Middletown, Ohio 45042. Wally sent pictures he had made here in New Jersey and wrote that he had spent a couple of days at a Region 4 meeting of Boy Scout administrative personnel in Louisville, Ky., where he gave a talk on camp inspection. Also at the Scout meeting were Mildred and **Tom Bartram** of 1084 Highland Dr., St. Albans, W. Va. 25177, who traveled on to see friends in Middletown, giving Wally an opportunity to show Tom the extensive camp facilities of the Miami Valley Council. Both Tom and Wally are holders of Scouting's highest award, the Silver Beaver. Wally says that he is being tempted to go to Philmont Scout Reservation near Cimarron, N.M., to take the camp training course next summer. . . . Helen and **Ed Farrand** report all is well at their new home, 5981 La Jolla Mesa Dr., La Jolla, Calif. 92037. In a personal note to your Secretary Ed says he is planning to travel to Cambridge on December 13 for a conference of Class Estate Secretaries, of which he was the first. He adds: "I haven't seen snow for 17 years!" . . . We wish to acknowledge a warm letter from Mrs. Fred B. Dadmun, 1400 Lake Shore Dr., Chicago, Ill. 60610, in appreciation for the letter of condolence from the Class and the note on Fred's passing which appeared in the *Review.* She says they shared the hobby of collecting Oriental antiques in porcelain, jade and ivory and in doing research on these rare pieces. She is continuing the avocation in cooperation with various museums across the country.

We get occasional reports on **Robert E. Waterman** from Munnie Hawes who has played golf with Bob on various visits to Florida, where Bob has a winter home at 920 Hibiscus Lane, Delray Beach, Fla. 33444. *Bioscience,* published by the American Institute of Biological Sciences, has a long illustrated article on the retired senior vice president of the Schering Corporation who still serves on its board, which he originally joined in 1944 as a director and vice president in charge of research and development. For many years previous to this time, he had been interested in vitamin research, dating back to his days in chemical research with the Bell Telephone Laboratories. He was one of the group which synthesized Vitamin B_1 and has written papers on its isolation and testing. One-time assistant to the president of the Research Corporation, Bob also served as consultant to the Alien Property Custodian in World War II and as that office's special representative for the production of atabrine, used by the armed forces to counteract malaria in the Pacific. Bob also attended Williams College and the New York University School of Business Administration and has written extensively on rubber technology, wood preservation, medicinal agents and aspects of technological management in the production of pharmaceuticals. He is a member of the Williams-Waterman Fund to Combat Dietary Diseases, former chairman of the North Jersey Section of the American Chemical Society, a fellow of the New York Academy of Science, member of the American Society of Biological Chemists and former corporate representative of the Industrial research Institute. He is chairman of the board of New England Nuclear Corporation and a director of White Laboratories, General Devices, Inc., Research Corporation and Frigistors Ltd. He is also a member and former president of the Harding Township board of education in New Jersey and has memberships in several golf and country clubs in both Florida and New Jersey. He and Elizabeth have a son and daughter and a granddaughter.

Publications from *Rubber Age* to *Fishing Tackle Trade News* have paid tribute to **Albert H. Wechsler** on his retirement last October from the presidency of the half a century old Converse Rubber Company, Malden, Mass., a pioneer in the rubber industry which he helped build to rank third in the nation's 91 canvas and rubber footwear manufacturers. In addition to the footwear division, the firm is known for sporting goods and industrial products that include Converse-Hodgman foul weather clothing, yachting suits, boots and waders as well as hockey pucks, mouthguards, and huge industrial rolls and rubber compounds used by the automotive, textile, photocopying, plastic, paper converting and leather processing industries. Tyer Rubber Division, Andover, Granite State Rubber Company, Berlin, N.H., Coastal Footwear Company, Puerto Rico, and Presque Isle Footwear Company, Maine, are all subsidiaries of Converse. Al joined the Company in 1929, following service with the U.S. Coast and Geodetic Survey in the Caribbean. He was made vice president and general manager in 1933 and president in 1961. He continues as director and consultant. He is credited with having actively carried on both personal supervision of daily operation and long range planning, the latter including a new idea in administrative engineering—a department devoted to analysis of computerized operational data for organizing the internal flow of information and developing better administrative methods. The concept views the business as a set of closely related groups, each devoted to a single objective whose overall operation in research and development, service or production can be improved by better flow of information. Al is a member of the Technion Society, the M.I.T. Stein Club, the Belmont Country Club and a director of Beth Israel Hospital, the Boston Center for Adult Education and the Combined Jewish Philanthropies. Albert and his wife Pearl make their home at 125 Willard Road, Brookline, Mass. 02146. They have two married daughters, Jean and Anne who are both Vassar graduates, and a married son, Joel, a graduate of Harvard and Columbia Law School. There are nine grandchildren.

O. Kenneth Bates retired last June as head of the mathematics department of St. Lawrence University, Canton, N.Y., after 34 years of service. He joined the university as a full professor and head of the department in 1933, having taught physics at M.I.T. from our graduation to that date. In 1942 he was in charge of the naval aviation program at St. Lawrence and in 1945 he was chairman of the academic policy committee while the presidency was vacant. He has carried on experimental research in the field of thermal conductivity of liquids which he had started at Technology. He holds the bachelor's, master's and doctor's degrees in Course II, all from M.I.T. He married the former Frances G. Westbrook of Ogdensburg, N.Y., and has four children. . . . The *Handbook of Electronic Instruments and Measurement Techniques,* by Harry E. Thomas,

'25, and **Carole A. Clarke,** '21, published last spring by Prentice-Hall, Inc., Englewood Cliffs, N.J., has proven so popular that it is going into its second printing. The authors have each been presented with a handsome leather-bound gold record edition by the publishers in view of the book's wide-spread acceptance. The hand-book's 400 pages of text and illustrations, supplemented by appendices, are arranged to provide ready access to comprehensive data on operating circuits and equipment measurement. We hope you'll find it useful and we will appreciate your comments for its improvement.

Graciela and **Helier Rodríguez** have appealed for used overcoats in good condition together with other warm clothing for the exiled Cubans who are arriving in Spain in a steady stream which taxes the limits of existing transportation. They now advise that, if your packages are addressed with the following legend, they will not be subjected to customs duty or other interference: Miss Cristina Fernandez de Oleaga, Caritas Nacional, Depto. Extranjero, Ropero de Cubanos, Santo Domingo 5-2° Piso, Madrid 13, Spain. They both have asked us to express to you their most sincere thanks for whatever you are able to send to aid an increasingly desperate situation. We're still awaiting your suggestions as to whom Helier should contact in the gypsum, plaster or lime industries in connection with his interest in a new development for processing these items. . . . Both Helier and **Robert F. Miller** have written about an enjoyable dinner at the Miller's home, 7910 Birnam Wood Dr., McLean, Va. 22101, while Graciela and Helier were in Washington, D.C., visiting her sister, Rita, whom we all met at the Class of '21 reunion in Cuba in 1958. Helier says they had an opportunity to meet most of the Miller family and to see Bob's slides of the visit of the Class of '21 to Havana. Bob adds: "While vacationing at our place at West Chatham on Cape Cod, Marion and **George Chutter** came over and we had a most delightful visit. They are getting to be real Cape Codders. We had hoped to have **Don McGuire** visit us, too. He has retired to Brewster. What with George Dandrow, '22, also in Chatham, there is getting to be quite a colony of year-round retirees from M.I.T. Our daughter, Kathleen, is still in Mexico City but will be home for Christmas. She has mastered the language and is taking dictation in Spanish and also transcribing it in Spanish. I am deeply engrossed in plans for our new Postal Training Institute and have a major responsibility to coordinate all the technical training for the new project. We'll start using temporary quarters in January 1968. Later, permanent buildings will be constructed and a collegiate level course of training in postal engineering at the undergraduate and graduate levels will be established. Helen has recovered from her two fractured wrists and, except for a little shoulder discomfort, I am back to normal. We're not planning on going to Mexico this winter but may take a cruise in March." To continue our previous plugs for the M.I.T. Club of Mexico City, the 20th annual Fiesta in Mexico will be held in Mexico City next March 14 to 16 and we can highly recommend contacting the Club at Reforma 116-804, Mexico 6, D.F., or phoning 46-57-74 for reservations now.

Helen and **Ray St. Laurent** report a three-week trip of some 3,000 miles from their summer home, Saints' Haven, Vinalhaven, Me., to visit at Center Lovell and then to tour the Gaspe and to visit Helen's family at Pugwash. They had just returned to close the Vinalhaven home and go back to 47 Gerard St., Manchester, Conn. 06040. Ray says they talked by phone to Graciela and Helier Rodriquez in New York. . . . Emma Lloyd has written to Maxine that she and Al Lloyd, '24, were in New York for the arrival of a granddaughter, Elizabeth Ann Hayes, on July 26 last, the first child of their daughter, Barbara, and the Lloyd's fourth grandchild. They are looking forward to having both daughters and their son and the grandchildren visit 35 Spruce St., Westerly, R.I. 02891, for the Christmas holidays.

The last directory of the Alumni Association of M.I.T. lists the following members of the Class who are active in alumni affairs, in the order of their appearance in the directory: William J. Sherry, Vice President of the Alumni Association; A. Warren Norton, former President; Henry R. Kurth, Class Representative on the Alumni Council; Garvin Bawden, who represents the Cleveland alumni club on the Council; Josiah D. Crosby who represents Bangor and Joseph Wenick, representing Newark; William J. Sherry is also a member of the Committee on Club and Regional Affairs and Edmund G. Farrand is a member of the Committee on Courses and Classes; Melvin R. Jenney is a director of Technology Student Enterprises, Inc.; the officers of the Class of '21 include Raymond A. St. Laurent, President; Irving D. Jakobson, Vice President and 50-year Class Gift Chairman; Carole A. Clarke, Secretary-Treasurer; Edwin T. Steffian, Assistant Secretary; Edmund G. Farrand, Class Agent and Estate Secretary; Edouard N. Dube, Class Agent; Robert F. Miller, Photo Historian; George A. Chutter, 50th Reunion Committee Chairman; Paul H. Rutherford, 50th Reunion Committee Vice Chairman; Samuel E. Lunden and Raymond A. St. Laurent, Honorary Secretaries; Harry A. Goodman, Boston Alumni Fund Special Gifts Chairman; Carole A. Clarke, Honorary Secretary; Sumner Hayward, Honorary Secretary and New York Alumni Fund Special Gifts Chairman; Joseph Wenick, Educational Counselor; Irving D. Jakobson, Honorary Secretary; Raymond A. Snow, Honorary Secretary; Wallace T. Adams, Secretary-Treasurer, M.I.T. Club of the Miami Valley and Educational Counselor; Charles W. Richards, Vice President, M.I.T. Club of Central Pennsylvania; Simon W. Freese, Honorary Secretary; Eugene W. Rudow, Honorary Secretary; Charles L. Manneback, President, M.I.T. Club of Belgium. . . . We hope those New Year resolutions included a reminder for you to write to your secretaries during the year 1968. Please do so!—**Carole A. Clarke,** Secretary, 608 Union Lane, Brielle, N.J. 08730; Edwin T. Steffian, Assistant Secretary, c/o Edwin T. Steffian and Associates, 19 Temple Place, Boston, Mass. 02111

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Our November greeting for the January *Review* really comes from **Dale Spoor,** Class Agent. He says, "Cool it, man, and shell out!" He is driving for a goal of more than 50 per cent participation in the Alumni Fund as well as starting on the five-year stretch toward the 50th Reunion and Class Gift. We will hear from him urgently and often. . . . **J. Russell Hemeon** of Trenton, N.J., has enclosed his November schedule in his announcement of plans to move to Leisure Village, Lakewood, N.J. in April 1968. He says **Tom Gill** is already enjoying the good life. Gus and Grace will sail on the *S.S. Independence* to Madeira, Casablanca, Gibraltar, Palermo, Naples, Genoa, Cannes, Barcelona, Majorca, Algeciras and the Canary Islands. Your Secretary has forwarded to him the best wishes of the Class for good weather and good health on the trip. . . . Chick Kane, '24, has forwarded a published letter from **William B. Elmer** in the *Globe.* Bill continues to be a constructive and loyal citizen and his word should be seriously considered for the good of our country. . . . **Oscar Horovitz** is continuing to win trophies in film competition throughout the world. A notice just received shows Oscar listed in the five star classification, *Who's Who in Motion Picture Photography.* A letter from Sydney, Australia, tells of Oscar gaining first place in the travel section, Gold Cup Competition, for his film *Singapore.* The Sydney Hill Country Club welcomed the Horovitz brothers, Sam and Oscar, in October as they entertained with their unusual movies of the *Exotic Pacific* and the *Israeli Story.*

Mrs. Bertha S. Wiener Dodge has published another book under the Little, Brown imprint with the title *Hands that Help: Careers for Medical Workers* which aims to explain the variety of contributions medicine has received from workers without M.D's. She reports that she is busy being a grandmother, an occasional teacher and a full time writer for the American Society of Tool and Manufacturing Engineers of Dearborn. . . . Your secretary failed to report last month that he was glad to meet and visit with another member of our Class from

Piedmont, Calif., **Dwight F. Johns.** Dwight attended the San Francisco meeting of Alumni officers with Mrs. Johns. . . . Our thrill of the month is printed in the Chatham *Shopper News* proclaiming "Mrs. C. George Dandrow Wins Needlecraft Award." She received first prize in the category of crewel original design and stitchery at the third annual Exhibit of Needlework sponsored by Needlecraft House of West Townsend, Mass. Mrs. Dandrow also received second prize in the category of outstanding crewel embroidery. George may have assisted, and would certainly help Catherine carry home the prizes to Chatham. We are all invited to admire them. . . . **Martha Munzer,** associate of the Conservation Foundation, has written about the great hope for improvement in pockets of poverty in a prosperous area. This has been published in *Pockets of Hope* by A. A. Knopf as a Borzoi book for young people. Mrs. Munzer chose five areas of the country in Pennsylvania, New Mexico, Michigan, Tennessee and the panhandle of south eastern Alaska to examine their evolution. Several stories include a history of the region followed by the drama of man's impact in changing the face of the earth. The stories then focus on some particular community in the region, a community that has already begun to pull itself up by the bootstraps. The relationships of self-help and government are woven into the narratives. A final section deals with the elements that seem to be responsible for making each of the communities visited a "pocket of hope." Martha graduated in electrochemical engineering and taught chemistry in the Fieldston School in New York for 25 years. Since 1955 she has been preparing materials to help teachers integrate conservation concepts into their science teaching. She has lectured widely for teaching and civic groups. Her other books include *Unusual Careers* and *Planning Our Town*. . . . **Charles E. Brokaw** represented President Howard Johnson for the celebration in October at the University of Denver. He was too modest to write your Secretary about the festivities. . . . We are sorry to be informed of the death of **John B. McCue** in August 1967. A note of sympathy from our Class has been sent to his wife Beatrice in Summersville, W. Va.

Florence Ward Stiles of North Amherst, Mass., has written about her retirement from the University of Massachusetts on August 30, 1967. She also expressed disappointment in having missed the 45th Reunion at the Wianno Club. She has completed an interesting job with the Planning and Engineering Division of the Physical Plant Department at the University reviewing the drawings and specifications for the academic buildings. Her specialty has been laboratory planning which she developed at DuPont in the Architectural and Civil Engineering Department. She had previously spent 17 years at M.I.T. as head of the Architectural Library and advisor to women students. She wrote that she enjoyed work in big organizations and the teamwork available which was necessary to complete the various phases of a job. Florence is going to live in a retirement community in Concord, N.H., which is for people over 62 who are active and interested in a profession and enjoy congenial surroundings. "The place is called Havenwood. It is located at 33 Christian Avenue, Concord, N.H. 03301, and this is my address after November 1, 1967. The location is ideal for I am interested in my Cornish genealogy and many of the records are in the Archives building in Concord. The other records are in Wiscasset, Maine. These ancestors were island owners, fishermen, ship builders, cabinet makers, traders and had great skill of hand. I just hope I can do all reading, one book leads to another, necessary. I hope the classmates who know me will find their way to Concord, N.H. I am just off route 202 going east, two or three miles from the State House. Turn left at East Side Drive, then second left to Christian Avenue. Havenwood is sponsored by the New Hampshire Conference of Congregational Churches. It is a pilot project. I am very proud of M.I.T. and I feel that my leg work has helped M.I.T. as much as my dollars ever could work. I believe my retirement is going to be an interesting phase of my life, and I will be able to make contributions of the intangible kind by volunteer work and encouraging the search for new horizons among my companions. There is so much hidden talent that every new situation may bring it to light. With best wishes to all my classmates, most of whom I am guessing are retired. I am 70 years old and I never would have guessed in 1922 I would feel such a drive 45 years later."

Among the new addresses received are those of Russell Hopkinson, New York, N.Y. 10021; Mrs. Elisabeth H. Hawks, Southboro, Mass. 01772; Mrs. William C. Richardson (nee Margaret Mall) Newton Upper Falls, Mass. 02164; Cecilio Alcincastre, Bacolod City, Philippines; Richard E. Boraks, Middletown, Conn. 06457; Paul B. Taylor, Kettering, Ohio 45429; Frederick A. Higgins, Lawrence, Mass. 08142; Harmon A. Poole, Litchfield, Conn. 06759; George W. Heathman, Dayton, Ohio 45419; Edward L. Lincoln, Attleboro, Mass. 02703; C. William Perkins, Bronxville, N.Y. 10708; Rev. Theodore S. Wray, Springfield, Pa. 19064; Henry W. Coughlin, Southampton, N.Y. 11968; Carl A. Burdick, Greenwich, Conn. 06833; Roland L. Smith, Charleston, S.C. 24907; Donald F. Carpenter, Mendenhall, Pa. 19357. . . . As a toast for 1968, "May your Christmas bills be paid promptly and your health and happiness continue forever and ever."—**Whitworth Ferguson,** Secretary, 333 Ellicott Street, Buffalo, N.Y. 14203; **Oscar Horovitz,** Assistant Secretary, 33 Island Street, Boston, Mass. 02119

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Hear Ye! 1968 is our 45th Class Reunion year! Have you mailed your $10, five year, class dues check to your Class Secretary? Have you made a contribution to the Alumni Fund? Any contributions, large or small, will bring the *Technology Review* to you regularly so that you can keep posted on the latest reunion plans which will be included in the 1923 class news. Have you sent news of yourself and your activities to your Class Secretary? Does your Class Secretary have your latest address for future class mailings? Our 45th Class Reunion will be held June 6-9, 1968, at the Blue Water Inn, 328 Winter Street, Hyannis, Mass. The class dinner will be on Saturday evening June 8. You will receive more information in future class mailings.

At the 1967 National M.I.T. Alumni Officers' Conference, **John E. Burchard,** Emeritus Dean of the School of Economics and Social Sciences, M.I.T., and presently Dean of the College of Environmental Design at the University of California, Berkeley, defended the concept that, "Many modes of travel will be needed from footpath to airplane, with each to be used only where it is reasonably effective. This does, among other things, suggest serious limitations on the privately driven automobile tomorrow," Dean Burchard said. . . . **Arthur R. Stuckey,** 6161 East 15th Street, Tucson, Ariz., reports the death of **Ivan Tyler,** Course I. Ivan suffered a massive coronary on October 4, and passed away on that date. After leaving Tech, Ivan worked for Southern California Edison on hydro construction. After a short period with the city of Pasadena he went with T.V.A. as materials engineer with the Pennsylvania Turnpike, and from that position he went with the Portland Cement Association where he remained for the major portion of his professional career, serving as field consultant in its head office. He was a life member of the A.S.C.E., a member and a former director of the A.C.I. He received the Henry L. Kennedy Award for his outstanding contributions to the advancement of the cement industry, and was for many years a member of the United States Committee on Large Dams. Ivan retired in 1962 and came to Tucson in 1963, where I met him again after 40 years through a chance encounter of his wife, Ann, and my wife. From that time we always attended monthly A.S.C.E. meetings and other engineering meetings together and were dinner guests in each others homes on many occasions. I held him in high regard as a fine gentleman and a good friend. He was modest and unassuming, fair minded in his judgements and impressed one with his integrity as a man and as an engineer. My wife and I were deeply saddened by the loss of our good friend and the shock to his wife and son.

With further reference to Mexican journeys I would add that we visited in Sonora, at Hermarillo and Guaymas for a few days in February. All went well so we ventured on a 2,000 mile round trip to Saltillo, Coahuila and to Monterey in July. At Saltillo we attended Spanish classes at the Universidad Interamericana

and lived with a Mexican family in order to add a few more words to our smattering of Spanish. The work schedule was a bit rough, classes from eight a.m. until seven p.m., with 2¾ hours off for lunch and a short siesta. We thoroughly enjoyed the school and our contacts with the Mexicans. We recommend Saltillo as an interesting and inexpensive summer vacation spot for those interested in Spanish and Mexican culture. As an additional side note, public transportation is relatively good throughout most of Mexico and amazingly cheap. . . . **Norman Weiss** reports that he "Retired on October 1, after 43 years with American Smelting and Refining Company, and has opened an office as consultant in metallurgical engineering in Tucson. Looks like a new and interesting career ahead!". . . . **C.V. Chamberlin** is retired and reports that he has two children, five grandchildren, and an interest in golf. . . . **Myron T. Chandler** retired from New England Telephone and Telegraph Company in 1963 and is now living in Waldoboro, Maine, the same town where his daughter and four grandchildren live . . . **Joseph Nissen** says he visited the art centers of Paris, Florence, Rome and London during this past summer.

Michael Drazen reports, "My son Mark selected M.I.T. and received early acceptance in December 1965. He is now a junior majoring in mathematics. Our younger son Allen is applying for admission and hopes to become a member of the Class of 1972. I am engaged in consulting work related to electric and gas rates." . . . **George A. Rowen,** President of the Rowen Leahy Company, reports one child, three grandchildren and says he spends lots of time at his farm in southern Vermont. . . . **Herman B. Swett** reports that he has retired. . . . **Frederick E. Klutey** reports that he is retired and enjoying it. . . . **Edward Battery** retired in 1961 after 35 years with Compton Advertising Inc. . . . **Raymond M. Meekins** retired in 1963 and is living in northern Virginia. . . . **Howard A. Lockhart** reports, "My wife and I plan to attend my 45th Class Reunion. I retired from business in June 1966, and am now doing consulting work in chemical engineering, in addition to trustee work for a local savings bank, and working with the Boy Scout Council, the Y.M.C.A. and the church. My chief duties as secretary of the Rotary Club of Haverhill, Mass., continue. My three children live in New York, Cuba, and Jaffrey, N.H.". . . . **Frederick O. A. Almquist** reports, "I expect as of now to be at the 45th Reunion." . . . Professor **N. A. Frank** says, "I am looking forward to our 45th Class Reunion." . . . **Earl C. Palmer** reports, "After 32 years with the National Biscuit Company in New York, I retired on November 1, 1966. My son Bill, an engineer, lives in Easton, Pa., and my daughter Nancy lives in Sewaren, N.J. Bill has two boys, and Nancy has two boys and two girls. They are doing so nicely that my wife and I are moving to Florida on November 1, 1967. My new address is 123 Aleander Drive, Jasmine Lakes, Port Richey, Fla. 33568."

The first A. L. Patterson Memorial Lecture was given by **B. E. Warren,** of the Physics Department, M.I.T., at the summer meeting of the American Crystallographic Association in August on the campus of the University of Minnesota in Minneapolis. The title of his talk was "A Modern Version of the Generalized Patterson Function for Amorphous Materials."

Walter T. Rolfe, 5683 Shady River Rd., Houston, Texas 77027, partner and co-founder of the firm Golemon and Rolfe, Houston, Texas, died June 10, at the age of 67. Prior to entering private practice in 1946, Rolfe spent 18 years as a professor of architecture at the University of Texas. As chairman of the department there and at North Dakota State University, he actively supported and participated in AIA educational programs and committee work. For his furtherance of architectural education and practice in Peru he received the Order of the Sun from that country's President in 1965. Rolfe was educated at the University of Kansas and at M.I.T. . . . Notification has been received of the Following changes of address: Charles T. Jackson, 47 Raymond Place, Hewlett, N.J. 11557; Ralph C. Lockwood, 160 Gordonhurst Ave., Apt. 32B, Upper Montclair, N.J. 07043; Rear Admiral Roy T. Cowdrey, 38 Grumman Hill Rd., Wilton, Conn. 06897; Frank H. Dillon, 28 Gale St., Malden, Mass. 02148; Michael Drazen, Drazen Assoc. Inc., 124 Gay Ave., P.O. Box 11360, Clayton, Mo. 63105; Dean John E. Burchard, College of Environmental Design, University of California, Berkeley, Calif. 94720; Walter Dietz, Box 2265, Delray Beach, Fla. 33444; Felipe Diaz-Ossa, P. O. Box 84D, Santiago, Chile; Earle A. Griswold, 700 South Ocean Blvd., Boca Raton, Fla. 33432; Robert L. Hershey, Chandler Mill Rd., Kennett Square, Pa. 19348; Joseph L. Hetzel, R.F.D. 1, Box 83, Middlebury, Conn. 06762; Ceil H. Green, Geophysical Service Inc., Box 5621, Dallas, Texas 75222; George H. Hurley, P. O. Box 412, Fern Park, Fla. 32730; and mail to Phillip H. Hardie has been returned from India. If anyone knows his present address, please advise your Secretary.—**Forrest F. Lange,** Secretary, 1196 Woodbury Ave., Portsmouth, N.H. 03801; **Bertrand A. McKittrick,** Assistant Secretary, 78 Fletcher St., Lowell, Mass.

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As many of you know, the annual Alumni Officers' Conference was held last September in San Francisco. It was the first ever off campus. Five of your classmates were there: Russ Ambach, Phil Bates, Rock Hereford, Bill MacCallum, and Hank Simonds, plus Mesdames Ambach and MacCallum. All are Californians except the Ambachs. Bill ran a session for club officers and was one of seven honored by receiving Bronze Beavers, the Association's highest award. His citation read, in part, ". . .his forceful leadership, advice, and counsel have been a source of strength and inspiration." A recent letter disclosed the fact that he has a new office. The impressive letterhead of the National Association for Industry-Education Cooperation has a long list of officers and like Abou Ben Adam, MacCallum's name leads all the rest. He's President. . . . The **A. T. Roigs** had a wonderful time on their South American trip. They caught up with the **John Fitches** in Rio and had lunch at the American Club, but missed the other connections they had hoped to make. . . .The behavioral effects of a few martinis is a subject that has been investigated by a great many of us from time to time, but **Hudson Hoagland** is investigating it in a somewhat different manner. He and some of his associates at the Worcester, Mass., Foundation for Experimental Biology are researching the effects of liquor on body chemistry. "Delineating the metabolic changes induced by alcohol is a necessary step to understanding the nature of alcoholism itself," said a spokesman. "Unfortunately relatively little is known in this long neglected field." Although few of us have neglected this field, it is probable that our researches have been improperly oriented!

In October President **Paul Cardinal** added another to his list of presidencies, that of a local, Upper Montclair, action group called the Fairway Association, maybe because he lives on Club Road. "We engage in town battles about speed limits, traffic lights and police efficiency." He was treasurer last year, and evidently enjoys fighting City Hall. Unless their plans changed, the Cardinals were scheduled to go to Houston in November to spend Thanksgiving with their daughter Carolyn. . . .Also off to Houston in November went the **Chris Conways.** By the time Thanksgiving came they should have been in Florida with their daughter Joanne in Coral Gables. In December Chris had a business trip to California, then back home to New York for the holidays. . . . Here are a few more retirees, some of whom will be hopping around the world like the Ambachs, Roigs, Cardinals, and Conways. Others will be sitting happily at home like the Kanes. **Silvio Massari** was with us only in our last year. He received his S.B. in mining. He recently retired from the American Foundrymen's Society where he was Director of Research. He started his career in the foundry industry and in 1926 became research director of the Association of Manufacturers of Chilled Car Wheels. In this age of specialization, is there one for hot car wheels too? Possibly a Cosa Nostra property? . . . **John Skinkle** is very specific about his future plans. He has been on the faculty at Lowell Tech for years and retired last June. "Am now reversing my life, staying at home in the summer around the new swimming pool, traveling in the winter. Going to Jamaica for intra-winter sun."

Perry Maynard is staying right at home in White Plains, "enjoying my new leisure." He'll undoubtedly discover, as many of us have, that the word leisure is a

misnomer. Give him another year and he'll be saying, "How did I ever find enough time to go to the office?" . . **Bob Dehlendorf** has discovered that southern California, La Jolla, wasn't the land of milk and honey he thought it would be. "After 1½ years we're moving to San Mateo, in support of our preference for northern California." . . . **Mike Cary** retires as Vice President of Virginia Electric & Power next March, and **Mike Amezaga** repeats his plaint, "Wish I could retire!" . . . **Elbert C. Brown** who was Senior Vice President of New England Utilities Service Company, in Hartford, Conn., died in September. He would have been 65 next April. . . .And so the year 1967 comes to a close. To all of you, travelers, stay-at-homes, and workers alike go the best wishes of all your class officers, and the hope that 1968 will be a pleasant and satisfying one for you. Look at the class notes for 1914 or even 1904, and you will see that a lot of us have a long time ahead in which to accomplish many things we have had to postpone until now. And that includes enjoying our leisure!—**Henry B. Kane,** Secretary, Lincoln Road, Lincoln, Mass. 01773

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A number of classmates are providing information as to their whereabouts and activities when they make their annual contributions to the Alumni Fund, and this is most helpful to your Secretary. . . .**Dan Keck,** one of our Class Vice Presidents, is now in the process of building his retirement home at Myrtle Beach, S.C. . . . **Arthur K. Sun** writes from Hartsdale, N. Y., that he has been retired from the United Nations since 1961 . . . From Houston, Texas, **William F. Herbert** states that he is enjoying his retirement after 32 years with Texaco, Inc., by becoming active in a new oil field service which diagnoses the downhole behavior of pumping oil wells. This service is one which he helped to organize. He continues to be reasonably active by maintaining personal contact with younger friends, which provides stimulation and delays the getting-old process. . . .**Wade Johnson** notes that he has now retired from the Goodyear Tire and Rubber Company and spends his summers at Oberlin Beach in Huron, Ohio, and winters at Sanibel Island, Fla. . . .**Henry Williams** has now been retired for 3½ years and is located in Orlando, Fla. He states he is still going strong, gets plenty of physical exercise taking care of his lawn, flowers and backyard citrus grove, two grapefruit and five orange trees. For relaxation he has a large HO Gauge Model Railroad layout on which the trains do complicated maneuvers automatically controlled by a computer which he designed and built. This year he is President of the Orlando Life Member Club of the Telephone Pioneers of America which has a membership in excess of 300.

Charles M. Cooper is still located in Northfield, Mass., except for occasional consulting forays which have taken him as far as Victoria, Texas. . . .A newsletter from the Volunteers for International Technical Assistance, Inc., the Boston Chapter of which is located in Cambridge, Mass., indicates that **Willard Allphin** is Secretray and Problem Coordinator of this organization. This particular bit of information is rather belated, since the newsletter was dated back in the winter of 1967. Perhaps Willard will provide his classmates with information regarding this group for a later issue of the class notes. . . .News of the passing of one classmate, **George F. Geis,** has come during the past month. George was living in Boiling Spring, Pa. The date of his death was not indicated.—**F. L. Foster,** Secretary, M.I.T. Room E19-702, Cambridge, Mass. 02139

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It's a rainy mid-November morning at Pigeon Cove but the two gulls that always show up for breakfast have already been around and departed with their bread crusts. There are two new young gulls this fall; we wonder what happened to the two older ones that came as regularly last year. We went over the clippings and letters last evening. One we came across was an announcement by **Abe White,** President of Barnstead Still and Sterilizer Company, that a new 110,000 square-foot plant would be operational by mid 1967. . . .Another item in our file by a local company president were the remarks of **Rex Bristol** of the Foxboro Company who was able to say that in the past 10 years his company's sales have tripled to $130 million, and more important, the earnings have more than tripled. Why didn't you tip us off, Rex, about your plans so we could have bought stock? . . .While on the subject of local presidents, here's a clipping from the Worcester *Telegram.* **"Robert Taylor Dawes,** President of Thomas Taylor and Sons, Inc., a 50-year veteran of the Boy Scout movement has accepted the chairmanship of the Guardian Sustaining Membership Program of the Algonquin Boy Scout Council for 1967. Holder of the Silver Beaver from the Algonquin Council and the Bronze Beaver from M.I.T., Dawes has served scouting in an adult capacity as assistant scoutmaster, scoutmaster, troop committeeman, district and council scouter and member of the executive board."

Having taken care of the local scene here are a couple of address changes that require some explanation. **Larry Cummings'** new address is given as 1101 Beach Drive, Victoria, British Columbia, Canada. . . . **Edgar Stevens** has a new address too; he lived in Marblehead but is now listed at East 607 12 Avenue, South Naples, Fla. He must have retired too. . . . Here's note from **John Longyear.** "For your use is the enclosed clipping regarding the death of **George Cummings.** Gay and I spent most of last winter in Arizona and southern California escaping the Michigan winter. A move is possible but is still vague. We send our best wishes to you and Ruth and enjoy happy memories of our visit during 40th Reunion time." The clipping John sent us from the Detroit *Free Press* states: "Dr. G. D. Cummings, 62, Associate Director of the Michigan Department of Health and Director of the department's laboratories, died at University Hospital, Ann Arbor. Dr. Cummings, of Lansing, was a member of the health department for 41 years and was nationally known for his work in gastroenteritis in infants and epidemic diarrhea in the newborn. Under his direction, the department developed an antibiotic for use against typhoid fever."

Howard Humphrey recently sent us a clipping from the New York *Times* with the comment, "Dave seems to be keeping busy in retirement. The clipping: "The appointment of **David A. Shepard** as Chairman of New York Public Library's 1967-68 drive for $900,000 for the Research Library centered at Fifth Avenue and 42nd Street was announced yesterday. 'One of our biggest jobs is explaining why the public library needs private funds,' Mr. Shepard said. 'Millions of New Yorkers assume that the library is entirely supported by tax moneys. This, in fact, is not the case. The system of 81 neighborhood branch libraries is supported primarily by the city and state. But the Research Library with a current annual budget of almost $7.5-million derives 80 per cent of its income from private sources.' " We talk with Dave frequently when he is at his New York office and can assure you, Howard, that he is keeping busy! . . .We never did report the names of those who attended Alumni Day last June, the first one your Secretary has missed in over 20 years. Those who made it were: Abbott, Harvey C. and Mrs.; Cunningham, Donald S.; Dawes, Robert T. and Mrs.; Dean, Robert C.; Haskell, Eben B. and Mrs.; Killian, Jr., James R. and Mrs.; Salmon, Chenery and Mrs.; Larkin, Jack and Mrs.; Breck, George W.

Before we sign off we must bring you up to date on local events. About a half mile off shore is Thatchers Island, normally occupied by the lighthouse staff of a couple of families. About a month ago a friend who lives directly across from the island began to see helicopters flying in and out of the island, searchlights at night, and much activity. Fishermen approaching the island were told to keep off. It finally leaked out that one of the Cosa Nostra who was willing to talk was being kept on the island by the F.B.I. to make sure he would be around for the Grand Jury. You can imagine the excitement this caused in a small seacoast town. About this time of year the class notes file gets thin so how about spending four cents for a penny postcard and sending along a tiny news item? Until we hear from you, cheerio.—**George Warren Smith,** Pigeon Cove, Mass.

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John P. Vinti is now consultant to the M.I.T. Experimental Astronomy Labora-

tory and was recently elected a member of the International Astronomical Union. He has a new address, 20 Chapel St., Brookline 02146. . . .We are glad to hear that **Mark Robbins,** who was ill and retired in 1963, is now traveling a lot, following the auto racing in New England and Canada. . . . **Samuel Levine** who received highest honors for his work as a U. S. Patent Examiner is now on the other side of the fence, a practicing patent attorney. . . . **Francis L. Burke,** since retiring in 1965 from Western Electric, has had a heavy schedule of travel; last year the Middle East, this year the Far East and next year he hopes to spend six months in Italy, northern Spain and Portugal. . . . **Roger A. MacArthur** died in Hinsdale, Ill., August 29. For the past 13 years he had been associated with the Central Manufacturing District of Chicago, and from 1954 to 1957 had been president of the American Biltrock Company. Mac came to Tech from Beverly High School and graduated in Course V. He was in the ROTC, and in World War II was a major in the U.S. army.

Fortune Magazine in its awards for this year has given the honor for the best engineering of a consumer product to Lennox Industries, Inc., of which **John Norris** is President, for the Duracurve heat exchanger. Fortune says "A problem of all heat exchangers is to design them so that they remain quiet and strong despite repeated expansion and contraction. The Duracurve exchanger uses one long smooth curve of sheet steel in each of its four main sections instead of many small bends commonly used in heat exchangers. With expansion and contraction the two smoothly curved sides move freely and in unison, eliminating conflicting stresses that cause the bothersome noises." Congratulations to Lennox and to John. [I know of at least one oil burner that doesn't operate as quietly as it should!] . . .M.I.T.'s Certificate of Appreciation has been awarded to **Harold W. Fisher** for his outstanding work over the past five years as Chairman of the 40th Reunion Gift Committee, and to **Richard P. Hawkins,** our long-time Class Agent for his outstanding efforts on behalf of the Alumni Fund. From where I sit, I believe that I am qualified to say that both of these men turned in superlative performances. . . .Another top job has been turned in by **Bill Taggart** in his capacity of Chairman of the Finances and Budgets Committee of the Alumni Association's Long Range Planning Report which has just been completed.

There is a spate of new addresses of which to advise: Professor Harriet Allen, after retiring from Keene State College, New Hampshire, has settled down in Thessaloniki, Greece, and has Box #167. . . .Edward G. Burgess, last addressed in Long Island City, is now at 24 Shady Lane, Little Falls, N.Y. [This at least sounds like a retirement street name.] . . .Manuel R. Castellanos, now returned to 15-26 Abbott Rd., Fair Lawn, N. J. 07410. . . . Nelson O. Clark, Rte. 1 Box 1431, Harrison, Ark. 72601. . . . Richard Cutts, Jr., 21 Lombardi Lane, W. Warwick, R.I. 02893. . . . James D. Flagg, 301 West Hills Rd., Knoxville, Tenn. 37919. . . . Edward F. Fletcher, 1129 Walnut St., Newton Highlands, Mass. 02161. . . . James E. Forbes, 9 Hawthorne Place, Boston, Mass. 02114. . . . Bernard Y. McCarty, 423 No. Old Ranch Rd., Arcadia, Calif. 91006. . . . Willard L. Munro, 23 Oak Hill Road, Chatham, N.J. 07928. . . . Russell R. Smith, 33 Avonside, Avon, Conn. 06001. . . . Francis B. Thorne has completed a circuit of California and Forth Worth and his new address is 203 Ledgewood Dr., Rochester, N. Y. 14615. . . .Harry E. W. Tinker 5370 No. Bay Rd., Miami Beach, Fla. 33140. . . . Robert C. Wallace, Apt. B-17, Wellington Arms Apt., Cortland, N. Y. 13045. . . .Miss Hilda Young, 970 High St., Worthington, Ohio 43085. . . .And all of this reminds me that the local postmaster tells me that I can't just use Masons Island as my address any more. The new address below is only a new description of the same stand.—**Joseph S. Harris,** Secretary, 654 Chippechaug Trail, Mystic, Conn. 06355

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Metropolitan New York classmates attending their fall luncheon at the Chemists' Club on October 19 gave **Abe Woolf** a warm and enthusiastic reception when he outlined the tentative plans for the 1928 on-campus reunion in McCormick Hall next June 7, 8 and 9. **Walt Smith,** Reunion Activities Chairman, and **Jim Donovan** journeyed down from Cambridge with Abe for the luncheon, and others attending were: Gerry MacGillivray, Chicago; Victor Decorte, Italy, both in New York on business; and the New York group of Henry Buntschuh, Wally Heidtmann, Bob Krummel, Thorwald Larson, Bill McClintic, Bill Murphy, Bob Murphy, Bill Phillips, Hal Porter, Claude Rice, Ed Ure and Ray Wofford. A show of hands indicated almost all plan to attend the 40th Reunion. Also, replies to the luncheon announcement from Newt Foster, Lazare Gelin, Terry Hurlbut, Henry LaCroix and Frank McDermott, who for various reasons couldn't attend, indicated their intent to join classmates at McCormick Hall next June. **Ray Wofford,** Reunion Vice Chairman for New York area, says several others who generally attend the Class of 1928 luncheons and other activities of the New York Alumni Center, Starke Dempewolff, Bill DuVernet, Morey Klegerman, Frank McGuane, Ted Pierce and Frank Sweeney, are likely planning to attend the reunion.

Bill McClintic has rejoined the New York group after several years in Florida. His new address is Federal Power Commission, 346 Broadway, New York, N. Y. . . . Congratulations to **Thorwald Larson,** perennial winner of reunion golf tournaments, and the recent winner of the New Jersey State Seniors Golf Association Championship played at historic Baltusrol Golf Club, Tom's home course, with rounds of 77-80. . . .A note from Abe Woolf, Chairman of the 40th Reunion, announces the appointment of a steering committee which includes Jack Chamberlain, Jim Donovan, Roland Earle, Bob Harris, Florence Jope, Art Nichols, Dick Rubin, Walter Smith, Herm Swartz, Abe Woolf and Charlie Worthen. . . .On November 3, a reunion committee meeting was held at the Sheraton Lexington Inn. It was a pleasant productive luncheon. Present were Jim Donovan, Abe Woolf, Florence Jope, Charlie Worthen, Ed Poitras, Dick Rubin, Walt Smith and Herm Swartz. The meeting was pretty well devoted to reunion activities next June, but there was also much discussion on Class Gift matters. This committee with other members will meet in December, February, April and May. And after all these meetings and all these notes and all this correspondence and all these pleas for money and attendance, if we don't have the smashingest 40th Reunion that was ever held at M.I.T., our Class will go down in history as spiritually retarded.

And we present a few notes from Jim Donovan, made after his trip to New York: **Jerry MacGillivray** was in the East and telephoned his old friend Tom Larson who brought him along to the 1928 luncheon. . . .**Bill Phillips** is now with Coverdale & Colpitts, consulting engineers. . . .**Claude Rice** speaking of his recent marriage said, "I've been lucky two times.". . .**Henry Buntschuh** has taken advantage of his retirement by spending several months in Europe with his wife. . . . **George Palo** was in New York for a civil engineering meeting, in fact he was chairman of a session, but had to leave early to keep the TVA going and could not attend the luncheon. . . . **Victor Decorte** was in from Rome; and being the very friendly warm and generous classmate he is, repeatedly said that if any members from the Class were coming to Rome, he would like to hear from them. He knows of two or three places where you can have an excellent dinner and excellent wine. Incidentally, Vic reports that our Venezuela contingent is coming to the 40th Reunion 100 percent strong, that means **Mariano Contreras** and **Gabe Disario**. . . .During the course of the luncheon it was mentioned that a fund had been started with the thought of helping some people who come from a distance. One of our friendly classmates proclaimed, "Count me in on supporting this."

Jim adds to these notes that, "In October there was a dinner given at the Boston Museum of Science by the Underwood Company in connection with the Underwood Prescott Award. Present from our class were **Bob Harris** and Helen, **Bill Gorfinkle** and Ella, and **Jim Donovan** and Frannie. In October the Institute had a meeting to which they asked some of the local businessmen. Our friend and classmate **Arthur Nichols** came, and it was certainly a pleasure to see him." . . .At a dinner meeting of the Alumni Council, to which your Secretary was

recently elected as an associate member, we noted from the published list of members that: Art Nichols represents the Class; Jim Donovan represents Denver, Colo.; **Rudy Slayter** represents Madrid, Spain; and **Walter Smith** represents Newport News. The Alumni Council meets seven times a year on the last Monday of the month at the Faculty Club. The work of the Alumni Council is normally done by committee, so the meetings are given over to hearing briefly each month of the affairs of the Association, and each month a member of the M.I.T. Faculty tells us about his newest activity. . . .Someone recently sent us a cover used with the *Complete Medical Guide,* 3rd revised and up-dated edition, by **Benjamin F. Miller,** M.D., Associate Professor, University of Pennsylvania School of Medicine, formerly director of the May Institute for medical research, Associate Professor of the University of Cincinnati Medical School, former lecturer on medicine at Harvard Medical School, and Senior Associate Physician at the Peter Bent Brigham Hospital. Other books written or edited by Ben have included *You and Your Doctor, Man and His Body,* with Ruth Goode, *When Doctors are Patients* with Max Pinner, M. D., and *Good Health* with Jay Burt. He is also Editor-in-Chief of the *Modern Medical Encyclopedia* and the *Modern Encyclopedia of Baby and Child Care.* From a photograph on the book jacket we note that Ben hasn't changed much in 40 years.

In an excerpt from a letter received recently from **Bill Erickson,** dated October 13: "You will note from this letterhead that I am no longer in the Bahamas. In September 1965 I retired as Vice President of Morton International, Ltd., and Manager of their Inagua operation. Last spring my wife and I bought a home at 60 Byron Rd., Weston, Mass., and we have just moved into it.". . .This letter from **E. Vernon Lewis** to Jim is dated June 14, 1967, and after the first page, which is concerned with metal fabrication, engineering statistics and other technical matters, Vernon goes on to write the following: "Bonnie and I still hope you and Fran will get down our way. We'd like to show you our new home and community, which we enjoy very much. Nancy took training as a dental assistant at Penn. this winter and has been working, even before the course was over. She started temporarily with a dentist in King of Prussia, but now has a permanent and apparently very happy job with a dentist here in Collegeville. Bonnie has been teaching economics in the evening school of Ursinus College for the past two years, and found it most enjoyable. This summer she has been employed by the college to write up the information for the Middle Atlantic Evaluation Committee, which will be no small task. As for myself, I have been teaching and carrying out a number of auxilliary responsibilities. By a combination of circumstances beyond my control, I also end up as president-elect of the Collegeville Lions Club, and expect to have a year of problems! I reckon I have run off at the typewriter long enough, particularly as I have to take care of several matters at the college, then leave this afternoon for the Torch Club convention in Grand Rapids. I am a past president of it, and swore I would continue to come after my days in office were over! Give our regards to Fran and to any people you may encounter who will still admit that they once knew me. I sometimes wish I was more of a 'reunioner', but, since I have been in teaching, I find myself so involved in the school where I work that it is difficult to work up energy and enthusiasm for reunions. I am sure it's my loss."

We have notes from seven members of our Class, which were written on the return envelopes addressed to the Alumni Fund: from **Elwood R. Anderson:** "My wife died in August 1965, and I was transferred to Baton Rouge in July 1966. I am still with Ethyl. I have remarried since coming to Baton Rouge.". . .From **Albert F. Briggs:** "I have no special news to report. I have reached retirement age and intend to enjoy it to the fullest. My youngest son went into the private practice of law this September 1. I have enjoyed serving as an educational counselor for the last eight or 10 years and interviewed two fine young men who have been accepted for admission at the Institute this September.". . . From **Harold E. Curtis:** "I retired a year ago after 37 years with the AT & T Company and Bell Laboratories. My wife and I then spent six months in Europe, and now I am enjoying my numerous hobbies, including horticulture and Curtis genealogy. We have two daughters, both Radcliffe, and two sons-in-law, both Harvard, and several grandchildren."

From **Gus Stachelhaus:** "With Sylvania Electric since 1933 at various locations, including Salem, Mass.; Huntington, W. Va.; Danvers, Mass.; Seneca Falls, N. Y.; Mt. View, Calif. I started in the tube lab, but now I'm in the electronic defense lab. I sure have been challenged to keep up, especially for a Course X man." . . . From **Tony Fleming:** "Suddenly after 40 years I am homesick. Tell Jim Donovan to get a record turnout of '28 men for 1968." . . . From **Edward S. Thompson:** "I retired in June 1965, after 39 years with General Electric. We built a house and moved to Rancho Bernardo, 25 miles north of San Diego Civic Center, in July 1966. Now concentrating on golf, photography, woodworking and some gardening." . . . From **Henry Gunning:** "On June 1, I retired from Douglas Aircraft Company, Inc. after more than 37 years of service."—**Hermon S. Swartz,** Secretary, Construction Publishing Company, Inc., 27 Muzzey St., Lexington, Mass. 02173

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This issue brings us into the new year of 1968. May it be a good one for all of you and may it be filled with happy events which your Class Secretary can report in these columns about the members of the Class of '29. . . .In addition to his many activities as Director of the Alumni Fund, Ken Brock is good enough to give a helping hand to class secretaries. While en route from Los Angeles to Houston, he read an announcement in the Los Angeles *Times,* October 2, 1967, of the betrothal of Cherry Carter to David Bianchi, son of the **Eric Bianchis** of Summit, N. J. . . .The roster of Chairmen for the 1968 M.I.T. Alumni Fund Special Gifts Area Organization includes one from our class, **Paul V. Keyser, Jr.,** of New York. . . .The 1967 National M.I.T. Alumni Officers' Conference in San Francisco September 29 and 30 was attended by **Everett P. Weatherly, Jr.,** of Shawnee Mission, Kansas, and **Oliver Moji** of Oakland, Calif. . . . The Alumni Office forwarded several newsbriefs which give us further information of our classmates. **Lawrence Hamlin** of Cos Cob, Conn., writes that he is still teaching calculus and regards this as a wonderful post-oil business vocation. . . .From Los Angeles, **Morris Smith** says he is now employed by North American Aviation, Downey, with activities involving both the Saturn and Apollo programs which he says are most interesting especially when he is trying to keep up with the various advances in space electrical and electronics activities. Now that Saturn went so well, Morris must feel good about it all. . . . **William Jones** of Charlotte, N. C., wrote that he was planning to retire in July 1967 after 20 years with Carbic Color Company, now American Hoechst Corporation, and will eventually move to Florida.

As of June 1, **Arthur Marsh** has moved to his home at Orrs Island, Maine, where he is continuing his manufacturers representative business in aircraft and electronics. . . . **Warren Walker** of Montclair, N. J., proudly writes of the graduations of his two daughters, Pamela from Harvard Medical School, and Roberta from Radcliffe College. . . . We were sorry to learn of the death of **John Courter** on September 23, 1967. John lived in Austin, Texas, after his retirement from U.S. Bureau of Public Roads in 1964. . . . At the invitation of **Frank Mead,** Chairman of the Alumni Council Membership Committee, your Class Secretary is now an associate member on the Alumni Council which meets seven times a year at the M.I.T. Faculty Club. Am looking forward to meeting with this group. Best regards to all.—**John P. Rich,** Secretary, P. O. Box 503, Nashua, N.H. 03060

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My apologies for the lack of notes last month. At the time the notes were supposed to be prepared I ran into a period of accelerated activity both at the office and in respect to certain extracurricular chores that had to be taken care of. . . . Let us begin with a few items about alumni affairs. **Greg Smith** is a very busy fellow indeed this year in his role as President of the Alumni Association. I

saw him most recently at the Philharmonic Hall concert in honor of Dr. Killian here in New York. Because of a delayed flight from Boston, Greg arrived unfed just before the concert started, but nevertheless did a fine job in making the Beaver Award presentation to the guest of honor. He had only recently returned from the Alumni Officers' Conference, which was held in San Francisco this year. Others attending the A.O.C. were **Warren Martell,** Long Beach, and **Bill Perret,** Albuquerque,. . . .Certificates of Appreciation have been awarded to a number of alumni for outstanding efforts on behalf of the 1967 Alumni Fund. Recipients in our Class included **Myron Huckle, Ralph Peters** and **George Wadsworth. Haskell Small** will be Regional Chairman in Washington, D.C., for the 1968 Fund. . . . **Al Intriligator** lives in Freeport, N.Y., and has retired. His older son Michael shuttled between M.I.T. and Yale during his college years, receiving an S.B. from M.I.T., an M.A. from Yale and a Ph.D. from M.I.T. He is teaching economics at U.C.L.A. Al also has a married daughter, a 15-year-old son and four grandchildren. . . . **Gerry Morse** gave a talk on automation at the ISA Conference and Exhibit in Chicago in September. He has been Vice President in charge of employee relations at Honeywell, Inc. since 1951. Prior to that he was director of employee relations with Sylvania. His daughter Gillian graduated from Drake University last June in business administration.

Parker Starratt has been appointed supervisor of inventories in the production scheduling division of Bethlehem Steel Company. As reported in the January '65 notes, we had a pleasant visit with the Starratts at their home on Biery's Bridge Road in Bethlehem three years ago. At that time Praker unearthed and turned over to me some ancient records that he had accumulated as our first Class Secretary. . . . **Max Wheildon** has been appointed Research Associate for the Norton Company Research and Development Department, Protective Products Division. . . .As many of you know, **Jack Latham** has for a number of years been in charge of Arthur D. Little's Division 500 which is concerned with cryogenic research and the development and manufacture of specialized cryogenic equipment. It has been announced that because of ADL's increased activity in this field, a subsidiary known as 500 Incorporated has been formed and Jack has been made President of the new company. . . . **Ludwig Jandris** is a civil engineer with Daniel O'Connell Sons in Holyoke. His oldest daughter Cornelia graduated from the University of Massachusetts and is teaching mathematics in Denver, Colo. Daughter Ellen attends Holyoke Community College, son Ludwig, Jr., is in the Navy and daughter Barbara attends South Hadley High. . . . **Earl Ferguson** is Assistant Vice President of the New York Telephone in charge of "(a) development of and revision of depreciation rates for all depreciable property of the New York Telephone Company (b) cost analysis and development of purchase and sale prices for property exchanged with other companies." He is also President of the Board of Trustees of the Arlington Avenue Presbyterian Church in East Orange. The Ferguson's daughter, Priscilla, graduated from Middlebury and is assistant to the Director of Promotion for Greeting Cards, U. S. Committee for UNICEF.

We have received a notice concerning the death of **Jarvis Wilson** on August 20, 1967, in Rochester. At the time of his death Jarvis was Operations Vice President and a director of the Rochester Telephone Company. Over a period of 30 years after graduating from M.I.T. he worked for the New York Telephone Company at Buffalo, Albany and Troy, then moved to Rochester in 1960. He was a director of the Lincoln Rochester Trust Company, past president of the Genesee chapter of the Telephone Pioneers, active in the Civic Music Association, the Memorial Art Gallery and the Chamber of Commerce, as well as vice president of the Rochester Association for the U. N. He is survived by his wife Muriel, a son David, and a daughter Mrs. Bruce McLennon. . . . Changes of address: Col. Angelo M. Ricciardelli, Communication Systems Inc., P. O. Box 530, Falls Church, Va. 22046; Maurice W. Mayer, 11 Euclid Ave., Summit, N.J. 07901; Godfrey E. Thomson, 63 Duke St., Pueblo, Colo. 81005.—**Gordon K. Lister,** Secretary, 530 Fifth Avenue, New York, N.Y. 10036

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Word has just been received that **Henry Ahlberg** has joined Lockwood Greene Engineers Inc. as a project manager in the Advance Planning Department. . . .**Fred Elser** reported via ham radio the other day that all is well with him and his family. Incidentally, we have a standing schedule every Saturday, or Sunday if we miss the Saturday contact, on 14,100 kc at 5 p.m. EST time on cw and would enjoy having our other classmate hams join us. . . .A recent clipping from the Waltham *News-Tribune* tells of **Harold Rice**'s appointment as part time instructor in mathematics on the Newton Junior College faculty. Formerly, Harold was department chairman at Wentworth Institute. . . . It was a pleasure to hear from **Frank Weeks** last week. He wrote, "After a long time of being out of touch with our Class of 1931, I have decided it was time to bring you up to date on some of my activities which you may want to use in your *Technology Review* notes. For the past 17 years I have been associated with the Joslyn Manufacturing and Supply Company in Chicago and am presently Director of Training and Manager of Publications. In the former capacity, I have been charged with the development of a training program for college graduates for our manufacturing facilities. Just this past week I visited M.I.T. to recruit engineering graduates and business administration graduates for this program. This work takes me to many college campuses, and it is always especially interesting to get back to Cambridge. On the lighter side, my wife and I have been doing extensive foreign traveling during recent years. Probably our most interesting trips have included India and riding elephants in the Nepalese jungles! We also traveled 1,000 miles down the Nile a few years ago to see Abu Simbel and other antiquities before they became flooded by the Aswan Dam. In 1967 we visited Scandinavia and especially enjoyed seeing the midnight sunup in Narvik. About 10 days ago I greatly enjoyed meeting the new President, Dr. Howard Johnson, and was privileged to sit next to Mrs. Johnson at the speakers' table at the Chicago M.I.T. club dinner. Looking forward to getting back to one of our class reunions soon.". . .**Jim Fisk** has been honored twice recently, first when he was appointed State Chairman of the Governor's Committee for United Nations Day and Week of 1967, and later on October 8, when he was awarded an honorary degree by Lehigh University. . . .The saddest work of a Class Secretary is to have to tell of the deaths of our classmates, and it is with deepest sympathy to their families that I report that **Robert D. Knight** passed away in August, and **Arthur M. Stoner** in July.—**Edwin S. Worden,** Secretary, 35 Minute Man Hill, Westport, Conn. 06880

James B. Fisk, '31

33

Happy New Year to all and here we are in a brand new year! I hope you have noticed how fast these years seem to come around. Won't you who are presently readers ask all classmates you meet if they are also readers? You will help me out, to say nothing of the Institute itself. . . .First, I must gather up a few loose ends from the last issue. We have a letter from **Cal Mohr,** following his visit in early September to East Liverwurst, Ohio, and Rochester, N. Y. Cal reports on Pfaudler in general and on **Walt Swanton** and **Bob Smith** in

particular. Walt was on the plane with Cal. Cal was en route to Pittsburgh, and Walt was on his way to Atlanta, with another Pfaudler man, aiming to wrap up an order for equipment for the recovery of chrome plating wastes. Cal also reports that Walt was the author of a fine article in *Chemical Engineering,* in February, 1967, entitled "An Inexpensive Answer to a Pollution Problem." Walt's youngest daughter was recently married and is living in Avon, N.Y., which is near where he lives. Cal phoned Bob Smith while in Rochester, but did not get to see him. Bob is still working on the commercial development of lucerite, described in detail in a former issue. Anyone who is interested in Pfaudler, Bob Smith, or lucerite may make a call at the new Pfaudler Technical Center just off the New York Thruway, at Rochester.

Monroe H. Kessler wrote a paper for the Sixth Latin American Iron and Steel Congress in Bogota, Colombia, September 26, 1966. The paper was entitled, "The Functions of a Quality Control Department." No news on any classmate is too old to use, or at least to send in, for insertion. Please send them all in. I request that Monroe send a short biographical sketch. He has been with the Wierton Steel Division of National Steel since 1933, going with them as a metallurgical apprentice. He was made assistant chief metallurgist in 1949, and then became chief in 1955, and in 1956 he became Assistant Vice President in the Quality Control Department. We extend to Monroe our most hearty congratulations, for a good job done, and for being chosen to make the address to such a distinguished group.

Leona and I had lunch at the Blackstone in Chicago, September 25, 1967, when we were on our way to the San Francisco Alumni Officer's Conference. To our immense joy Cal and Joan Mohr were able to join us. Joan had not been well, but she made it and it was our pleasure to meet her for the first time. . . . The night before the beginning of the San Francisco Conference, Leona and I had a small cocktail party at the Mark for a few friends, associates and classmates. Other than those mentioned in the December notes, several could not make the Conference but did make the party. **Ellery Clark** came all the way to San Francisco from Sacramento, after leaving his wife in the hospital for what he called minor surgery. That is a long, long ride, and our sincere thanks to Ellery for being so thoughtful. Also from the Class were Irene and **John Hayes,** of San Mateo. From the Alumni Association staff came Don Severance, John Mattill and Fred Lehmann. The officers of the M.I.T. Club of Northern California were invited, but only one was able to make it, Roy Reynolds, '51. We all enjoyed the small get-together.

Mal Mayer was surprised not to see me at the Alumni Seminar, but reported on a few who were there. **Herb Bremner,** and Harriet attended. Herb is President of the Hodgman Rubber Company of Framingham, and both of them are active in the Urban Renewal Authority in Brookline, Mass. **Ed Rohn** and Mrs. Rohn came from Glendale, Calif. Ed is still with Lockheed and is active in the Anti Submarine Program. **W. Dorwin Teague** is still in industrial designing, and gets away from it all in his 38-foot sailboat, which helped him to win his class in the Halifax Races. **Jack Turner,** President of Barrett and Turner, was also in attendance, and seemed to be greatly interested in Mal's leisurely way of life. Mal is undecided about what to do this winter, though he is considering another trip around the world or to Puerto Rico. The Mayers recently acquired a trailer, and went to Expo '67 with it. . . . I am writing this in Hawaii. Our 10 days in this paradise will soon be over. We will return to San Francisco via the *Lurline.* Today while Leona and I were enjoying a light breakfast at the beach edge I leaned back and saw a tall, handsome fellow who answered to the name of **Bob Winters.** Returning from an official trip to Japan, Bob was relaxing for a few days. As Minister of Trade and Commerce of Canada, Bob certainly gets around. Needless to say, we spent some time together. Bob and his lovely wife, Eleanor, will attend the 35th Reunion next June. Bob left Sunday morning via Trans Canada, and was expected to land in Vancouver where a Canadian Government plane was to take him back to Ottawa.

This morning I taxied over to the Honolulu International Airport to have lunch with **Frank Der Yuen,** an aeronautical engineer of some note. Frank is Vice President of Aloha Airlines, Inc., of Hawaii. He has a son, an M.D. in Seattle, and one daughter, married and living in San Francisco. He has been blessed with three grandchildren, one granddaughter, and two grandsons. Frank spent part of a year with Glenn L. Martin in Baltimore in 1934. Then he went to work for the then Nationalist Chinese Government Service as a civilian employee in the Aeronautical Commission. I asked Frank about his lineage and he told me that he is ¾ Chinese, born on the mainland (Calif.), and that the missing quarter is English, his mother. Returning from China, Frank went with the Harlow Company of California as Vice President and General Manager, after which he was with Northwest Airlines for a time, and wound up with many years at Lockheed before going to Aloha in Hawaii. He was with Lockheed 10-11 years, in California. It was an interesting visit.

From Michigan comes a plaintive note from **Frank Heselton.** Frank says that he reads these notes with the yearbook at hand to refresh his memory on some of the names that appear. Frank and Mrs. Heselton had just returned from a meeting in Detroit of the Michigan Association of School Boards and Administrators where he addressed the group with a paper entitled "Financing Michigan School Boards." It is no less than wonderful what a fellow like Frank can accomplish in one short meeting. He was elected Vice President of the Michigan Association of School Boards which leads to the Presidency in another year. A real worker, Frank says that he needs the year to prepare for the next one, and that it is well worth the time as it all has a tremendous effect on the lives of two million children. Frank reports that Mrs. Heselton is progressing more than satisfactorily after her serious spinal fusion operation. He spent most of the summer fishing and living in a cabin on the St. Mary's River which he says is "the most beautiful in the world." I know from personal experience that it cannot be bettered. This next is a reply to a reunion question; take a jet from Detroit June 7, a.m., and arrive at Cape Cod in the afternoon. The party starts in the evening at cocktail time.

Upon arrival in Exeter we found a short and very fine note from **George Henning,** Vice President, which had a few personal remarks from George, though modesty forbids any quotations, remarks concerning the late August interim report, a feature which will be repeated if enough material is available. Please keep this in mind if you really liked the interim. George wrote, "Sorry that I have been so poor in supplying news. Life goes on at such a rapid pace that we seem to accept news items as every day occurrences." . . . "I have a note from **Mal Mayer,** who is living in Washington, Maine, 04574, and who

wrote to me after seeing an announcement of our eldest daughter Helene's wedding to Edward F. Cavanaugh, 3d, during September. Mal tells me that the Mayers are two down and one to go, having four grandchildren, and that last year Mal sold his business, is semi-retired, and spends about six months in Maine. In the winters they travel." Say I wonder where Mal will go this winter. Incidentally, Washington, Maine 04574, is Mal's address, as the town has no streets, and Mal even makes his own power for his house.

Two of our service men have retired, **Dominic Chiminiello** and **Leonard J. Julian.** Dominic retired a short time ago after 32 years of military duty, most of it with the U.S. Army Chemical Corps as a colonel. Dom has been a contract negotiator at Kelly Air Force Base, took an M.B.A. from St. Mary's University at San Antonio, and taught business management evenings at San Antonio College. . . . The Chiminiellos have four children; the oldest boy is a helicopter pilot in Vietnam; their only daughter is a captain nurse with U. S. Army; a second son is this year finishing at the Texas University Law School; the youngest entered St. Mary's University this year. "Enjoying retirement in the great Southwest," says Dom. It sure was and is great to get such a good story about the Chiminiellos. . . . From across the river we hear from the other army man, retired Lt. Col. Leonard J. Julian. Len writes that after three years he is still enjoying his retirement, and is working on his hobbies: photography, tennis and travel. Len and wife visited the Orient recently to be with their son Rodney on his four-day rest and relaxation in Bangkok. Rodney, to the great joy of his parents, made his appearance on Mother's Day. Rodney is a truck driver in support of troops and activities in the Central Highlands of Vietnam. The Julians were celebrating their 30th wedding anniversary while on the trip to visit Rodney. Though Leonard is retired, Mrs. Julian still holds her job as secretary to the Superintendent of the Recreational Department in the Brookline, Mass., Town Hall. Rodney will be discharged and is due home soon. The eldest of the Julians' two daughters is a physicist in California, and the younger is a student at George Washington University.

Forrest P. Dexter, Jr., is a man of few words. He is Professor of Geology at Union College of New Jersey. His wife is a Radcliffe, '34, graduate, and is Chairman of the Commission on Social Concerns of the Methodist Church, and also on the Board of the Day Care Center of Crawford, N.J.
. . . **J. Dyer Potter, Jr.,** comes along next. He is not with the retirees, just from the Army, Corps of Engineers, in 1963. He spent three years with the Air Force in War World II, in the Southwest Pacific. Dyer has been with the Connecticut State Highway Department for 34 years as Division Engineer of Construction, with the above lapses into the services. He tells us that he is due to enter the hospital about October 12. Any letter to the Connecticut Highway Department is sure to reach him. . . . **Otto Putnam** writes, "After 34 years with the Althouse Chemical Division of Crompton and Knowles I have resigned, and have no current plans beyond an extended rest to regain my sense of humor." To regain it you have only to travel about 350 miles next June to Chatham Bars Inn and see what time has done to some of the other chaps of 1933.

Early in January there will be a release from the 35th Reunion Committee, and the names and addresses of all those who have declared their intention to attend the Reunion will be included in the letter. **Roger Congdon** asked a question on his returned card, "Who would you like to have attend the Reunion?" It is not too late to tell Rog, or me, or Goodridge, or Jim Turner. . . .We have but one address change for this month: **Athelstan F. Spilhaus,** 1117 Barberry Rd., Bryn Mawr, Pa. 19010. . . . It is but five short months until we gather at the Chatham Bars Inn. Those who have not sent in their reservation are still in a position to do so. Our Florida address as of this writing is 1079 Hillsboro Beach, A1A Highway, (mail) Pompano Beach, Florida. Come see us!— **Warren J. Henderson,** Fort Rock Farm, Drawer H, Exeter, N.H. 03833

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It is indeed sad to report the death of **Charlie Parker** after a long illness. Charlie was older than most of our Class as he had graduated from Wentworth Institute and went to work with Bethlehem Steel for eight years before coming to M.I.T. But he was always very much in the thick of things. His dry and pungent humor often brought down the house, as was the case in later life. An aluminum enthusiast challenged Charlie at a large metallurgical meeting with "Aluminum can do anything steel can do." Charlie replied, "How do you make a file?" The effect was catastrophic. Since graduation Charlie had been with the Iron and Steel Institute, first as the only engineer and later as Vice President of Research and Development with almost innumerable engineers under him. Even while at home in a weak condition, his office would constantly call him for direction. His activities were many, including much to do with Washington and international affairs. He leaves his wife Frances and a son Donald who has two children and is teaching at Lafayette College after an outstanding post-graduate program. Fran is living at 3 William St., Norwalk, Conn. . . . Dr. **Ralph Brown** has two jobs. He is helping to overcome the shortage of medical doctors in this fashion. He is in the Wesson Hospital, Springfield, Mass., for 40 hours a week in the emergency section, which really must be a strain. Then he goes to nearby Palmer to act as a consultant for about a half a day, 20 days in each month. Ralph enjoys his work and hasn't lost any of his interest in engineering matters or old M.I.T. friends. This is natural as he only became a doctor in 1950.

Proctor Wetherill follows his Course X training by being a chemist for two related companies in paints and aerosols, but his activities also include urging 300,000 Christmas trees to grow. This takes a good deal of his time weekends, and he looks forward to cutting 25,000 trees this season.
. . . **Bill Overbeck** continues his important contributions in the field of nuclear reactors, which started in 1942 when he assisted in the start-up of the world's first reactor at the University of Chicago. He is head of the laboratory of the Savannah River Plant of the A.E.C., which is run by DuPont. This lab gives multiple services and helps developments to produce plutonium and tritium. His son Jim is still at M.I.T., and very active in physics. Do you think M.I.T. would let a personable fellow leave campus after graduation if he is also the kind of fellow who achieves a straight 5.00 average during an entire year?
. . . There were very few in our Class who were better known, admired, and who drew such a warm chord of response from us all as did **Rudy Churchill.** He was so well-known as Rudy that it is hard to believe that his real name was William Randolph Churchill. He was managing editor of the *Tech,* but always seemed mentioned where something important was going on. Rudy was Merchandise Manager of W. T. Grant when he retired two years ago to live in Christiansted, St. Croix, V.I., largely because of emphysema. There life was less hectic, and the climate was less hard on his breathing. Even in his last years of work in New York Rudy was as helpful as ever to all who called on him. He went out of his way to lecture against smoking, which he said he gave up too late. Rudy will be deeply missed, not only by his wife Louise and his three sons, but so many who knew him at Tech.

The following story about **Phil Kron** ran in a purchasing trade paper. "E. Philip Kron was elected Assistant to the Vice President of the 8th District at the Council meeting held in Newark on February 15, 1967. Phil Kron is a graduate civil engineer from M.I.T. of Rochester and R.I.T. He also taught a number of subjects at the R.I.T. evening school. Phil began work at Kodak Park in June 1934 in the accounting department. In July 1935 he transferred to the engineering, construction and maintenance division as assistant to the superintendent. He left the company to enter the Air Force in January 1942. In December 1945 he returned to Kodak Park as assistant to the superintendent of engineering, construction and maintenance. He was appointed supervisor of the adminstrative staff in January 1947,

and he held that position until October 1947 when he left the company to become general partner in Brookman Kron Associates, a manufacturer's representative in Buffalo, N. Y. At the same time he held the position of treasurer and director of the Dustex Corporation. He returned once more to Kodak Park in February 1950 as a buyer of mechanical equipment. In January 1953 he was appointed assistant director of purchasing. Phil has served on many local Rochester committees and also numerous business organizations. He has served not only as director, president and vice president of the Rochester Association but chairman of practically every local and district committee. Today he is D.N.A. for the Rochester Association. Phil has delivered over 50 speeches before nationwide audiences on purchasing subjects and has published several articles in *Purchasing* and *Purchasing Week*. Honors have been bestowed on Phil by honorary scholastic and engineering fraternities. He earned the World War II Service Medal and retired from the U.S.A.F. with the rank of lieutenant colonel in 1961. In the area of educating our youth he has been active as cubmaster, chairman and treasurer of the Rochester area Boy Scouts of America. Our newly elected Assistant to the Vice President of District 8 is a native of Rochester, as is his charming wife, Eleanor. Phil and Eleanor have three sons and four grandchildren.

Charlie Finnegan, Course VI, has been at Martin, Orlando, Fla., since 1962. He is currently Engineering Manager of their RADA program. . . . **Edgar Svikis,** Director of Budget and Planning, Moore-McCormack Lines, has retired after 33 years with the company. He joined Mooremack in 1934 in the Engineering Department. In 1936 he was named chief statistician, in 1953 budget director, and in 1961 planning director. Mr. Svikis has conceptualized many applications of computers to management information and control systems including the enterprise Simulation Model Development in collaboration with I.B.M.'s Advanced Systems Development Division.—**James Eder,** Secretary, 1 Lockwood Road, Riverside, Conn.; **George G. Bull,** Assistant Secretary, Mid-Atlantic, 4961 Allen Road, Washington, D.C. 20016; **W. Olmstead Wright,** Secretary, 1003 Howard St., Wheaton, Ill.; **Norman B. Krim,** Secretary, 15 Fox Lane, Newton, Mass. 02159

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News for this month's notes comes from a variety of sources, including news releases, letters, and information sent in on the Alumni Fund donation envelopes. . . . The Wyandotte Chemicals Company announced the election of **Carl S. Smith** to the company's Board of Directors. He is now Vice President for Operations in the Industrial Chemicals Group; prior to that, he was Industrial Chemicals Marketing Vice President. Carl has degrees in both chemical engineering and business administration from M.I.T. . . . Two classmates attended the recent meeting of the Water Pollution Control Federation in New York. They were **Bernard B. Berger,** Director of the University of Massachusetts Water Resources Research Center, and **George M. Reece,** who was recently promoted to Associate at Fay, Spofford and Thorndike of Boston. . . . From his sixth year of retirement, **H. M. Oshry** writes that he is pursuing his hobbies of rebuilding businesses into profitable operations (three), managing political campaigns, raising children (five), playing duplicate bridge and reading. . . . **George E. Agnew** reports that his son, Carson Agnew, is a member of the M.I.T. class of '70. . . . **Richard A. Marciano** announced the birth of a fifth child in December 1966, raising the total to two girls and three boys. Dick was written up in the Boston *Globe* recently as follows: "Holes-in-one are reserved for those par three holes, so it was something of a shock when Dick Marciano turned in a card with an ace on the par five 460-yard 10th Friday, playing in the Indian Ridge Member-Guest Tournament. Actually, it was a net hole-in-one, but Marciano came as close as he could to the real thing with a double eagle two."

From **Benjamin Blocker** comes word that his son, Richard Jonathan, was awarded his M.D. degree last June and is now interning at the Rhode Island Hospital in Providence, and that he eventually hopes to concentrate in ophthalmology. . . . **L. J. FitzGibbon** reports that he and his son, Herbert, won the National Father and Son Tennis Championship at the Lockwood Cricket Club after eight previous attempts. . . . **Art Anderson** writes, "Have found my experience on the Visiting Committee, Course I, and work on the Educational Council stimulating and rewarding. These contacts with the Institute have brought into sharp focus the tremendous changes and the immense challenges we face.". . . From **Allen Mowatt** before his recent departure on a 3½ week business trip to the West Coast came the following note: "The Seventh Annual Class Golf Tournament ended with a repeat champion for the first time. **Ham Dow** won a match played by mail with **Bob Anderson** to win the second time in succession. Everyone will be out to knock him off his perch to keep the President's Cup in circulation next year, three wins permanently retires it." —**Phoenix N. Dangel,** Co-Secretary, 329 Park Street, West Roxbury, Mass. 02132; **Irving S. Banquer,** Co-Secretary, 20 Gordon Road, Waban Mass. 02168

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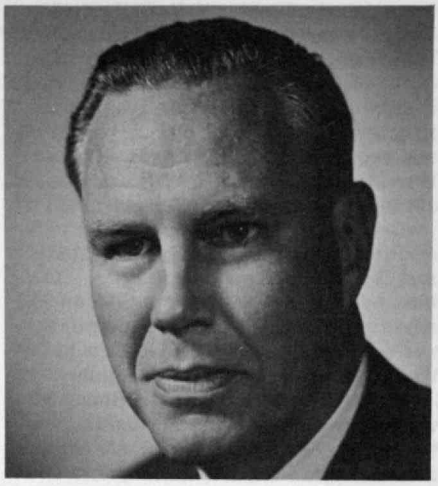
Having missed last month the mail bag is full indeed. A card from **Frank Parker**



Carl S. Smith, '35

announced that after almost 30 years he has left the firm of Charles T. Main, Inc. and opened his own office not "for the practice of consulting engineering, but to pursue other interests." His business address is 97a Newbury Street, Boston 02116. Some of Frank's other interests include serving as a Director of the Norfolk County Trust Company and as a member of its Executive Committee and Mortgage Loan Committee. He is also a Director of the Loyal Protective Life Insurance Company and a Trustee of the Tufts New England Medical Center Hospital, the Human Relations Services of Wellesley and the Home for Aged Negro Women. We wish him well. . . . **Mike Pettebone** writes that on June 30 he retired from the Navy and assumed the position of coordinator of cooperative work-study programs at Indiana State University in Terre Haute. After receiving his S.M. in 1937 he worked for Esso before joining the Navy in 1941. Except for a brief period after World War II he has been in the service since. Captain Pettebone was Commanding Officer of the U. S. Naval Ammunition Depot at Crane, Ind. . . . **Win Stiles** writes from Tunisia where his address is U.S.A.I.D. c/o American Embassy, Tunis. After graduation Win spent five years in China and India with Caltex Oil Company. After a four-year stint in the Navy the Stiles's lived in Milwaukee and the San Francisco area while their children were growing up. He writes: "By 1961 our son and daughter had arrived at a point where it seemed advantageous to pick up again our first love, travel. We went to West Africa, Ghana to be exact, where I was associated with Kaiser Engineers as Contact Administrator on the large Volta River Hydroelectric Project. It was there that we first became interested in the work of the Agency for International Development and, after our tour in Ghana was over, we joined A.I.D. with our first assignment here in Tunisia in 1963. My present job is Chief, Public Works and Engineering Division, for this mission. The work is very interesting and I find that the engineering-business training of old Course XV

comes in very handy. We are administering loans to the government of Tunisia aggregating about $50 million worth of construction, and there is plenty to do to make sure that construction goes along efficiently and economically. We do hope that if there are any Class of '36 travelers out this way they will look us up."

As President of the Institute of Electrical and Electronics Engineers **Walt Mac Adam** has traveled more than 40,000 miles to far-flung places, including two weeks in the U.S.S.R. and trips to Western Europe and South America. . . . Another traveller is **Laddie Reday** who with his family is off to Australia, New Zealand and Tahiti. . . . **Fred Assmann** and Mary toured Ireland, England and Austria this past summer. . . . **Eli Grossman,** Senior Vice President of the Great Eastern Life Insurance Company, attended the Alumni Council Meeting in San Francisco and reports Hank Lippitt, Dick DeWolfe, Leonard Cohen, Dick Halloran and Malcolm Blanchard in attendance. The Hallorans have been in San Francisco for a year or so. Dick is serving as consultant to construction companies in estimating and controlling large projects both domestic and foreign. Leonard is lecturing at San Jose College in addition to his work at Lockheed. . . . **Sidney Cornell** has been appointed Assistant to the Vice President for Engineering of EPSCO, Inc. The company designs and manufactures communications products and systems, data handling programs and systems and automatic typewriters in Westwood, Mass. . . . Also in the news are **Dorian Shainin** who was chairman of a conference on Quality Control Practices in the 1970's at Andover, N.H., last summer; and **Walt Squires** who celebrates 30 years with Esso Research and Engineering Company. . . . **Alan Brigham** has received a certificate of appreciation from the 1967 Alumni Fund for his effort as Regional Chairman in Springfield, Mass. He is with U. S. Rubber in Chicopee Falls. . . . Serving the Fund in 1968 are **Bob Wead** in the San Fernando Valley and **Bob Worden** as Special Gifts Chairman in the Philadelphia area. Let's all get behind them with our contributions and send in your news with your check.—**Alice H. Kimball,** Secretary, 20 Everett Avenue, Winchester, Mass. 01890

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Due to the illness of your Secretary the report on our 30th Reunion has been delayed. Good health now prevails, and with your help we hope to be able to report each month in our Class notes. . . . Our 30th Reunion, held at Oyster Harbors Club on Cape Cod, was a fun affair attended by the following members with their wives: B. E. Bennison, Norman A. Birch, Edward V. Corea, John B. Corbett, George S. DeArment, Charles M. Dierksmier, P. H. Dreissigacker, Raymond A. Dreselly, John H. Fellouris, Max Gerson, Robert C. Clancy, Robert H. Goldsmith, Harry B. Goodwin, Josiah S. Heal, Edwin T. Herbig Jr., Melville E. Hitchcock, John K. Jacobs, Gray Jensvold, Charles R. Kahn, Jr., Lester Klashman, James G. Loder, Austin C. Loomis, Leo Moore, Clifford Lytle, John B. Nugent, Thomas O'Brien, Jack Ostrer, Philip H. Peters, George A. Randall, Robert P. Rudy, Rolf Schneider, Leonard A. Seder, Walter H. Sherry, Joseph J. Sousa, Harry S. Stern, Jr., Robert H. Thorson, Ralph B. Webster, Walter Wojtczak, Albert S. Wynot, Richard G. Young and Arthur Zimmerman. The weather was perfect, the golf course superb, the sociability beyond compare. At our class meeting on June 10 a motion was made to continue our present slate of officers. A spirited debate took place, but after much discussion [silence] the motion was unanimously passed. We moved up to the Institute on Monday, Alumni Day, where we were joined by **Win Gay** and **Martin Kuban.**

Bill Bergen, who resigned as President of the Martin Company Division of Martin Marietta Corporation last January, has been named head of the North American Aviation, Inc. program for the Apollo lunar missions. Bill has a reputation for troubleshooting that dates back to his graduation. He was chief of the Martin Division, then Glenn L. Martin Company, that got the company into missiles and electronics. He was instrumental in the development of the Air Force Matador missile and the Navy's Viking high-altitude research rocket. Under his leadership Martin developed the Titan ICBM into a rocket that performed faultlessly in carrying 10 Gemini spacecraft into earth orbit. . . . **Harry Wallin,** Rear Admiral U. S. Navy, has assumed command of the Atlantic Division of the Naval Facilities Engineering with additional duty as Fleet Civil Engineer of the Fifth Naval District. . . . **Tom Hallenbeck** has recently returned from his first business trip around the world and writes that he has "a new respect for what technology has done to shrink the world.". . . **Ed Herbig** is still retired, but is increasingly spending his efforts on public service. His latest appointment is to the Governor's Commission in Higher Education to determine future plans for higher education in his state of Minnesota. . . . **Bill Hartmann** is an architect and partner of Skidmore, Owings and Merrill of Chicago, Ill. He has served on the Metropolitan Housing and Planning Commission and the Mayor's Commission on Chicago's Architectural Landmarks. Recently he has become a member of the Chicago Cultural Establishment.

Nancy Klock is Assistant Professor of Electric Engineering at the University of Hartford. She is the only woman on the engineering faculty. Nancy recently spoke to the Women's Association for the University of Hartford, on "The Engineering Co-ed". . . . **Joe Keithley** is President of Keithley Instruments, Cleveland, Ohio. His company has just moved into a new 1,000,000 dollar factory and office building at Solon, Ohio. This factory was tailor-made for many of the complexities of electronic instrument development and manufacture. . . . **Fred Claffee** is with Du Pont working on employee relations and problems of European nationals. He has just been assigned to Geneva for a period of several years duration.—**Robert H. Thorson,** Secretary, 506 Riverside Ave., Medford, Mass. 02155; Professor **Curtiss Powell,** Assistant Secretary, Rm. 5-325, M.I.T., Cambridge, Mass. 02142; **Jerome Salny,** Assistant Secretary, Egbert Hill, Morristown, N. J.

38

At the National Alumni Officers' Conference in September at San Francisco, **Lou Bruneau, Don Severance,** and **Hal Strauss** held the banner for '38. [Actually Lou and Hal held it, since as has been explained elsewhere in the *Review,* Don was doing a lot of non-partisan waving as well!] Hal reports, "The meeting in San Francisco was a very bright mark in the annals of the Alumni Association. Even we southern Californians must compliment those northern Californians for a good job. It brought together about 150 class and club officers for a workshop and exchange of ideas. Most welcome was the opportunity it provided for many who could not attend meetings in Cambridge to obtain a first class overview of the Institute, its present problems and achievements—as well as an on-the-spot description in depth of the long range plans for education, facilities, housing, and alumni participation. [You can get this same inspiration at Chatham in June!] Speaking for myself I can say that nothing was lost by having the meeting in San Francisco. After the Conference Sandy and **Lou Bruneau,** and Henrie and I spent a few hours roaming around

Joseph F. Keithley, '37

Fisherman's Wharf, enjoying the seafood delicacies found only there, and riding the famous cable cars. We would have enjoyed a larger delegation. **Leon Baral** and Esther were here in Los Angeles for about two weeks at the end of August, and we spent a few hours together. Leon is finishing his 30th year with Davison Chemical, now a division of W. R. Grace. They expect to join us at the 30th. I've also gotten confirmation from the **Doc Wochos, Bill Shamban**, and **Jack Rosenberg** clans of their intention to come! Since our daughter Susan is graduating Friday, June 7, Henrie and I will probably arrive in Chatham a day late."

Hal also enclosed a letter from **Chung-Chee Wong,** with the further note, "I may see him towards the end of November as Henrie and I are going to be in Japan, Hong Kong, and Bangkok from November 11 to December 4!" C-C Wong says, "I thank you for your letter and recent pamphlet on Surveyor I. Being an entrepreneur these years has become too much for me and I have chosen to close down my rooted hair vinyl doll factory during the present chaos in Hong Kong. I do not intend to continue in business, but instead would like to get back into engineering. Hong Kong is no longer a good hunting ground as people will not be opening up new businesses here. Nor would I like to wake up one morning some years from now to confront the Red Guards! I am thinking seriously of emigrating to America or Canada. I do not expect to find anything near ideal at first. Although I have been deep in administration and finance these last 20 years, I have always been actively connected with manufacturing and engineering. For example, I continued lecturing at the Technical College evening school in advanced machine design through 1961." C-C built the Wright Cyclone G-1000 engine at the Aircraft Engine Factory, Kweichow, China, and then moved into electroplating, import and export, and real estate. The minute he started in dolls, however, he became President of the Hong Kong M.I.T. club, and held the office for four years!

Tenkoku Tourneys are nothing new to C-C Wong. But you, is your entry in the mail? In the spirit of our 30th Reunion, a contest has been underway for the last month to determine the symbol or crest most fitting to express the essence of Chatham in '68. At least as early as the Chin Dynasty this skill of distilling a message into the artistry of a seal came in for approbation. The winning creation for Reunion 30 is solicited under the following regulations: (1) Entries must be submitted to the Class Secretary postmarked no later than January 10, one week after delivery of this issue of the *Review* if the holiday mails are slow. (2) Entries must be accompanied by 25 words or more, suitable for inclusion in the class notes. (3) The panel of judges will be the most competent available, and there will be no appeal. (4) All entries become the property of the Class of '38.

"Dr. **Harry Green** Joins Microelectronics Lab" is a headline in the October 30 *General Dynamics News.* "I've just changed jobs," Harry adds in explanation. "I am still in Rochester but have moved from the Stromberg-Carlson Division to the Electronics Division of General Dynamics." Harry has been principal engineer in Stromberg's materials engineering department, and was a member of a special committee that made a corporate-wide assessment of the research capabilities in the materials area at General Dynamics in 1958. He also worked with the ASM handbook committee on electrical contact materials and copper-base alloys, and was chairman of the committee on heat treating of copper alloys. He will now be engaged in materials oriented activities in the microelectronics applications laboratory. Although he is credited with camping and ice-skating, Harry says, "One of my favorite pastimes that was not mentioned is photography. I started taking 16mm movies with an Eastman Model K in 1939. I have movies of my two boys, now 27 and 24, from the time that they were babies. I have graduated to a Bolex now and have made travel shorts including Canadian Rockies, Germany, Canadian Maritimes, and most recently Expo '67! Harry, 3d, who finished Cornell in '63 with a B.Ch.E. is now with Corning Glass as assistant glass technologist at State College, Pa. He is married and has a boy and a girl, so Ruth and I are grandparents! Richard, who finished Case Institute with honors in 1965, is an electronics engineer with G.E. at Nela Park in Cleveland." . . .**Dave Acker** had a prominent part in the formation of the AIChE's new Food and Bio-Engineering Division. Represented on the first major program of the Division in Mexico City in September, Dave contributed to the symposium *Product Evaluation—A Tool for Quality Control and Process Improvement,* written jointly with Dave Rest and Fernando Perez, all of A.D. Little Inc.

Paul Arthur, Jr., who took his Ph.D. with us, has been credited by DuPont with the discovery and investigation of chromium dioxide, the first new media to go into magnetic tapes in 20 years. Previously no compounds of tetravalent chromium had been known. Paul was exploring at DuPont's Central Research Department for "new and useful chemical compositions by conducting reactions under conditions of high pressure and temperature similar to those which exist deep beneath the earth's surface. . . .He succeeded in synthesizing a number of new materials including high-purity chromium dioxide of fine particle size. Further investigation led to the discovery of a number of new magnetic materials and provided a starting point for a broad research program on magnetism and magnetic materials in progress at DuPont's Experiment Station." This pioneering work of Paul's has now been carried to commercial fruition, with DuPont's announcement of commercial production of chromium dioxide tapes for computer and instrumentation. . . .**Ira Lohman** has been presented a Certificate of Appreciation "for outstanding effort on behalf of M.I.T. in the 1967 Alumni Fund," in recognition of his leadership as Regional Chairman for Santa Clara County. Determined to better his own record, Ira has accepted the same assignment for the 1968 Fund! . . . Congratulations to **Joe Vallone!** "I have regained my sight after six eye operations, three on each eye," Joe says, "after being legally blind!" In his note for the 25th Reunion biographies, Joe reported that a mysterious virus disease contracted in 1961 had invaded the mucous membranes and damaged the corneas. Operations at the Lahey Clinic were designed to patch infected areas of the corneas. "I am now driving again, have 20/20 vision with glasses, and can do everything but play golf."

Bill Preece proudly reports, "Son, Bill Jr., is enrolled in the Class of 1971!". . . **Bill Guindon,** S.J., has little time left for physics at Boston College. "Beginning my second year as Vice President and Dean of the College," Bill reports, "with most of my activities centered around working with the faculty. We recently revised our whole policy-making structure for academic matters, and I work a lot with the elected Committee on Educational Policy. We are facing up to curricular reforms, student power problem, the possibilities of going coeducational, and the complexities of general academic development." . . . "Still operating at H. Schwartz and Sons in Fall River," advises **Izzie Schwartz.** In the retail building supply business, 20 years in Fall River (plus a lot of work!) have produced a very substantial business. . . .**Chauncey Bell** admits that he spent six months in Thailand at an Air Force Base, "worrying about the war" for the Rand Corporation. With the Logistics Department at Rand, Chauncey set out to prove that you could also think outside of a tank. "Came home with respect and admiration for the Thais and their country. Hope to return on vacation soon." . . .We spent a very pleasant evening with **Bruce Leslie** and Ruth last June at their new home in Bristol, R.I. Bruce picked a spot where he could look out over the mooring of their Ariel. Since our daughter has graduated from Pembroke we will not be in Providence so frequently—and darned if we're going to have a fire just to get Bruce here! "Ruth and I almost saw **Gordon Hunt** and Betty in London last spring," Bruce added, "but we were foiled by a phone operator's misunderstanding." . . ."I am one of four pathologists on the staff of the Department of Pathology at the Massachusetts General Hospital," notes **Ed Taft,** "and I am also an Associate Clinical Professor of Pathology at the Harvard Medical School. I am occupied largely in research administration at the Hospital, and in teaching at Harvard."

Howie Banzett reports from Los Angeles,

"After being a lifelong resident of the East Coast, I suddenly find myself in California, where I have been transferred as manager of Alcoa's Los Angeles works. Edna will stay in Lancaster, Pa., until our daughter Lorelle finishes high school next spring. Son Bob is a junior at Penn State." . . ."Became president of Hugh J. Baker and Company in January 1966", **Dave Baker** advises us. "Daughter Judy is a sophomore at Albion College." The company fabricates structural steel, and makes a nationally distributed telescoping scaffold. For several years Dave has been a hard worker on the Indiana Citizens' Council on Crime and Delinquency, and is a former chairman. With this intense activity, together with a term as President of Indianapolis Rotary Club 1966-67, and a little bit of working for a living, I wonder how Dave finds time for his weekly philatelic column, *U.S. Classics!* . . .How are you doing at gathering your closest friends for a reunion at the Reunion, June 7-8-9-10? It's less than six months away! And now is the time to put the finishing touches on that sketch of our Reunion Symbol. Do you have the lucky winner that best expresses the spirit of '38 in '68? Now is the time to mold that *kuchi* into an exhilarating display of *shoho*! Put your determination on the line, your inspiration on the paper, and your reservation in the mail.—**Frederick J. Kolb, Jr.,** Secretary, 211 Oakridge Drive, Rochester, N.Y. 14617

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Ernest O. Ohsol, X, has been appointed Vice President for Research and Development of the Escambia Chemical Corporation, of Wilton, Conn. Ernest joined Escambia after two years as vice president of technical development of the Chemical Construction Corporation, New York City. Prior to that, he was vice president for development with Haveg Industries, Inc., Wilmington, Del. Escambia, a subsidiary of Electric Bond and Share Company, manufactures a number of industrial chemicals, and is the world's largest producer of alkylamines. . . .**Mrs. Richard L. Odiorne** (Katherine Louise Harris), IV, President of her own firm, Living Space, Inc., of Yellow Springs, Ohio, has begun making a lifelong interest in plants and architecture pay off, according to a recent story in the Chicago *Sun-Times*. Not industrial plants, but all kinds of growing plants intended to add a new dimension to graceful living. Preferably, Louise likes to work with an architect in designing a home from the beginning so as to provide proper space for growing all kinds of beautiful, exotic plants and trees within living areas. . . . Some of the first returns of news items generated from Alumni Fund contributions have arrived. Here they are, along with many thanks for your respective contributions. **George William Beer,** XII, returned from Algeria in 1961 and settled in Walpole, N. H. Bill has his own firms, the William Beer Company and the Connelly Coal and Water Company. "I transport and distribute fuel oil and coal, drill water wells, install heating and water systems and consult on petroleum and ground water geology. Real country boy." . . . **John M. Gray,** IV, is a practicing architect in Boston. He is registered in Massachusetts, Maine, Rhode Island and also holds a National Architect Certificate. He has been chairman of the Salem, Mass., planning board since 1949. His practice includes churches, schools from elementary through college, as well as commercial, public, industrial, and residential buildings.

Paul Arthur, Jr., Ph.D.'38, inspects the surface gloss of "Crolyn" magnetic tape, a new product for computer, instrumentation, and video recording use.

Julius A. Lucas, X-B, is still with the Goodyear Tire and Rubber Company in Akron, as manager of the Engineered Products Department, a sales organization concentrating on rubber products for the auto industry. . . . **Joseph A. Neuendorffer,** VIII, is an Operations Analyst at the Center for Naval Analysis, Arlington, Va. "Busy summer: married off a daugter, attended son's graduation at M.I.T., celebrated silver wedding anniversary, and attended Expo '67." . . . **Thomas J. Reading,** I, wrote, "Member of Board of Directors of American Concrete Institute. Have recently published several papers dealing with concrete." In the new *Alumni Register* Tom is listed as Materials Engineer, U.S. Army Corps of Engineers, Omaha, Neb. . . . **Burton D. Rudnick,** XVII, says that "for the past 10 years I have been actively engaged in the field of industrial and commercial real estate in eastern Massachusetts as owner, developer, and broker." He is listed in the *Register* as owner of Harley Realty Corporation, Brookline. . . . Rear Adm. **Edgar H. Batcheller,** XIII-A, according to a news clip from Quincy, Mass., is Commander of the Charleston, S.C., Naval Shipyard. He was promoted to rear admiral in 1961 by President Kennedy. He had been in Quincy to attend a meeting of top shipbuilding officers.—**Oswald Stewart,** Secretary, 3395 Green Meadow Circle, Bethlehem, Pa. 18017

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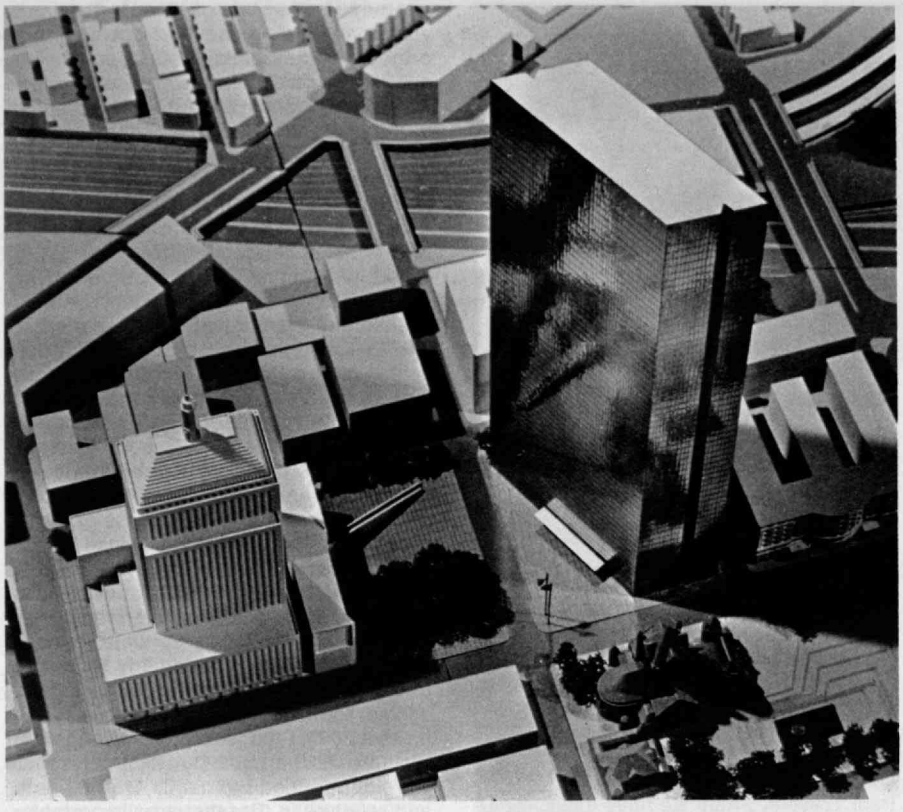
As a result of the Alumni Fund Drive, I have received a number of short notes from classmates. . . . **Bob Deshon,** IV, has been appointed Assistant Dean of the College of Design, Architecture and Art at the University of Cincinnati. He is also a professor of architecture. . . . **Ed Wallace,** XIX, writes, "Going south this winter. Moving manufacturing plant from Massachusetts to Connecticut. Girth, age, descendants and golf scores all increasing." . . . **Bob Dorsey,** IX-B, is Manager of Lighting Development for General Electric at Nela Park in Cleveland, Ohio, and is also Director of the Illuminating Engineering Society. . . .**Ed Bernard,** II, was recently elected President of Sidney Lemberger & Son in Belmont, Mass. . . . From **Jack Danforth,** II, comes word that he has been named Director of the High Voltage Power Corporation, a subsidiary recently formed by the High Voltage Engineering Corporation, of which Jack is Vice President. . . . **Harold Fairbanks,** XIX, is Professor of Metallurgy and Co-director of the Material Science Engineering Graduate Program in the Department of Chemical Engineering at West Virginia University. He presented papers on ultrasonic research at two international meetings in 1967: the Symposium on the Surface of Glass in Luxemburg on June 5, and the Symposium on Sonics and Ultrasonics in Vancouver, British Columbia, on October 5. . . . **Bruce Duffett,** X, has recently joined Marbon Corporation, Division of Borg Warner. Bruce writes, "We are involved in the rapid expansion of Cycolac and are a very fast moving company."

Divo Tonti, XV, received the Columbian Foundation Annual Achievement Award for 1967, for Americans of Italian descent. He was cited for his various civic and cultural activities and particularly in view of his efforts in behalf of the Garden State Arts Center under construction at Telegraph Hill Park in Holmdel, N.J., alongside the Garden State Parkway. . . . From **Milt Green,** V, and Gitty comes the following: "Just attended the International Congress of Photographic Science in Tokyo. Had a grand time and liked Japan very much. Spending a few days in Hawaii on the way home." Milt is one of the bright young men who are responsible for the Polaroid Camera development. He has many patents in the photography field. . . . By the time this column reaches you, **Herb Hollomon,** VIII S.B. III Sc.D., will have delivered one of the all society lectures at the American Society of Mechanical Engineers' winter annual meeting held in Pittsburgh. Herb's topic is "Technology and Society." He is now President of the University of Oklahoma, and formerly was Acting Secretary of Commerce.

Roy Avery, X, who is Managing Editor of the American Chemical Society News Service, has recently moved from New York to Washington since the



The John Hancock Mutual Life Insurance Company has unveiled plans by I. M. Pei ('40) and Partners for a 60-story tower to be built beginning in 1968 in Boston's Back Bay. It will soar above the present Hancock Building (left) the Sheraton-Plaza Hotel (right), and Trinity Church (foreground) as the tallest building in Boston.

Society is combining its efforts at its Washington headquarters. . . . We were represented at the M.I.T. Alumni Officers' Conference on September 29-30, 1967, by Al Castle, Charles Edwards, Herb King, Joseph Knight, J. A. Samuelson, William Peck and John Rittenhouse. . . . In the current Alumni Fund Drive, **Frank De Wolf** is Chairman of the Erie, Pa., region. Frank and **Charles King,** who has been Regional Chairman of the Corning Glass Works, New York, were awarded certificates of appreciation for their outstanding work in the 1967 Alumni Fund Drive. . . .While this is the January issue, it will reach you just in time for your Secretary to wish all a healthy and prosperous New Year. Among your New Year's Resolutions, don't forget to put down "Write to Al", and then don't break the resolution.—**Alvin Guttag,** Secretary, Cushman, Darby & Cushman, American Security Building, Washington, D. C. 20005

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Arthur J. Weinberger died suddenly on October 12 at the age of 48 years. Since 1964 he had held the position of Supervisor, Commercial Development Department, Research Division of the W.R. Grace & Company. From 1947-64 he was associated with the American Cyanamid Company in various capacities: as process engineer from 1947-51; senior process engineer 1951-55; research chemical engineer 1955-60; and senior research engineer from 1960 to 1964. While at Cyanamid he invented an improved process for the desalination of salt water. It is reported that aspects of his invention are expected to be utilized in the 150 million gallon a day desalination unit to be built in Los Angeles. Upon receiving his master's degree in 1942 he joined the Polaroid Corporation as chemical production supervisor. He was a member of the American Institute of Chemical Engineers, a Registered Professional Engineer in the State of New York, and a member of the M.I.T. Club of Washington, D.C., at the time of his death. He leaves a wife and one child who reside at 1019 Edgewater Parkway, Silver Spring, Md. . . . **D. Reid Weedon, Jr., Robert W. Blake, Clifford Moffet,** and **Edward F. Murphy** attended the 1967 National M.I.T. Alumni Officers' Conference in San Francisco on September 29-30. . . . **Edward A. Beaupre** is apparently worried about his age for he reports that his oldest son, Richard, was married on September 17, 1966; his daughter, Roberta, was married on October 12, 1966; his number two son was married on September 16, 1967; and his remaining number three son is a senior at Tufts–*Tempus fugit.*

Robert W. Blake reports that he: "had a visit from **Joe Bowman** and Ginnie during the Paris Air Show in June. Then, after a little over two years in France, and delivery of 70 Falcons to Pan American, Ruth and I returned to the U.S.A. to take up where we left off five years ago. We spent the month of July driving leisurely across the country, including a stop at Denver for a return visit with the Bowmans. I am now settled in Seattle in my new post as Pan American Resident Representative, Advanced Aircraft, at Boeing. Here there are M.I.T. alumni too numerous to list. Nils and Janet Rosenberg, '40, were our first dinner guests in our new home. A couple of Sundays ago, by pure chance, I ran into **Arthur Lowell** on a visit to the Seattle Space Needle. He is now Assistant General Manager of Lockheed's Missile Division in Sunnyvale, Calif." . . . **Erling H. Hustvedt** wrote in to say: "Since August 1966 I have been in the Technical Analysis Division of the National Bureau of Standards working principally on government information systems. Often see **Bob Wilson Blake** at N.B.S. I am now a Captain U.S.N.R. and participate in the Reserve Program." . . . Captain **Earl P. Finney** retired from the U.S. Navy in 1960 and since 1961 has been with the Boeing Company as a research engineer in the Systems Cost Research and Analysis Unit of the Aerospace Group, Missile Division.

Arthur W. Weber is one of seven prominent professional engineers named by the National Society of Professional Engineers to represent the engineering profession on a panel to advise the newly formed Public Broadcast Laboratory of the National Educational Television Network on matters pertinent to engineering and technology. The advisory panel will form the basis for program topics on timely engineering achievements. Arthur is a Vice President of Corning Glass Works. . . . **E. Kirkbride Miller, Jr.,** was among 99 alumni awarded a Certificate of Appreciation for his efforts on behalf of M.I.T. in the 1967 Alumni Fund for outstanding effort in making that fund year the great success that it was. Kirkbride was Special Gifts Area Chairman for Baltimore.—**Walter J. Kreske,** Secretary, 53 State Street, Boston, Mass.; **Everett R. Ackerson,** Assistant Secretary, 16 Vernon Street, South Braintree, Mass.; **Michael Driscoll,** Assistant Secretary, 63 Centre Street, Nantucket, Mass. 02554

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A note from **Charlie Smith** tells us that he was elected to the Board of Directors of the Chamber of Commerce of the United States last spring and represented the employees of the United States at the International Labor Conference in Geneva, Switzerland, in June. Charlie is President of the Steel Forge Company in Cleveland. . . . A long news clip and picture from the Springfield, Mass., *News* reports that Colonel **Art Sweeney, Jr.,** who was Commanding Officer of the Springfield Arsenal, has been reassigned and will assume command of the Watervliet, N. Y. Arsenal effective November 15. Art has been on duty with the Ordnance Department since graduation. He has attended Harvard Business School, Industrial College of the Armed Forces, and the Command and General Staff College. His Army career includes duty at the Army Ballistic Missile Agency in Huntsville, and with the Army Control

and Disarmament Agency in the Department of State.

Eastman Kodak announces the appointment of **Jim Littwitz** as Assistant Superintendent of the Paper Sensitizing Division at Kodak Park Plant. Jim has been with Eastman Kodak ever since his release from active duty in the Chemical Warfare Service in World War II. He has been active in the M.I.T. Club of Rochester and is a past President of that club. Jim has served on the Educational Council for the Rochester area for many years. . . .Three of our classmates received Certificates of Appreciation for outstanding efforts from the 1967 Alumni Fund. They are **Ed Vetter,** a retiring Fund Board member; **George Schwartz,** our Reunion Gift Chairman; and **Jim Stern,** the New Rochelle, N.Y., Regional Chairman. . . . **Charlie Speas** represented M.I.T. at the Western Maryland College Convocation in Westminster, Md., on October 21. . . . Let's hear from all of you with some news. How about a postcard? Write it now! Thanks a lot.—**Ken Rosett,** Secretary, 191 Albermale Road, White Plains, N.Y. 10605

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The 25th Reunion is but five months away. By now you have received your preliminary registration papers, your information sheets for the Reunion Book and your request for class dues. Almost all who plan to attend will be bringing children, who will be housed separately from their parents and for whom special programs are planned. Keep this in mind because I am sure you will discover that your children are keenly interested in participating in these four wonderful days. . . . **Raymond Frankel** has been elected to the board of directors of Sun Chemical Corporation. He is President of Technological Investors Management Corporation, an international consulting organization which specializes in advising institutional and private investors in areas of advanced technology. He is also currently a director of Baird-Atomic, Inc., and has served as a director and official of various companies in the electronics, mining, and publishing industries. He was formerly associated with the Electric Bond & Share Company, the Nathan W. Levin Company, and J. H. Whitney and Company

Thaddeus J. Pieczonka, Director of Water Pollution Control for the City of Lackawanna, N. Y., has opened up his own laboratory under the name of Pieczonka Labs., Inc. He specializes in the field of waste water analysis and is a consultant in the field of waste water management and control. . . . Classmates who received certificate awards for their efforts in the 1967 Alumni Fund were **James O. McDonough** as Class Agent; **Earl Bimson,** Special Gifts Chairman in Arizona; and **Andrew Hillhouse, Jr.,** Special Gifts Chairman for San Diego. . . . **James B. Reswick,** in association with Theodore Messerman, is heading a research team investigating the relationship of tooth loss and chewing at Case Institute of Technology under a grant from the U. S. Public Health Service. They will use a special electronic instrument which they developed to study the actual mechanics of chewing. . . . **Stanley Proctor** of Cleveland represented M.I.T. at the inauguration of the new President of Hiram College in Hiram, Ohio, last October. . . .We finally caught up with **Paul Travers,** whom we have discovered to be the Manager of Systems Engineering Laboratory since 1960.

James K. Littwitz, '42

We do not expect a great deal of news about individuals to be published in these notes during the next few issues because most of you will have sent in your biographies for the Reunion Book. This is to be expected. We will continue to remind you, however, that the Reunion will take place from June 7 through June 10, 1968, in Cambridge, Mass. **Ken Warden,** our Reunion Chairman, has assembled a committee of dedicated classmates who are working hard to make this Reunion a grand and glorious experience. **Ned Swanberg** certainly deserves our admiration and respect for the tremendous job he is doing as Reunion Gift Chairman. It appears that we will be able to present to M.I.T. this June one of the most substantial gifts of any 25-year class in history provided some deep-pocket soul-searching takes place in the next few months. As our friend, **Fred Kaneb** in Canada says, "I am as strong as a bull moose and you can use me to the limit." Will all the bull moose please stand up and be counted!—**Dick Feingold,** Secretary, Ritter & Berman, 266 Pearl Street, Hartford, Conn. 06103

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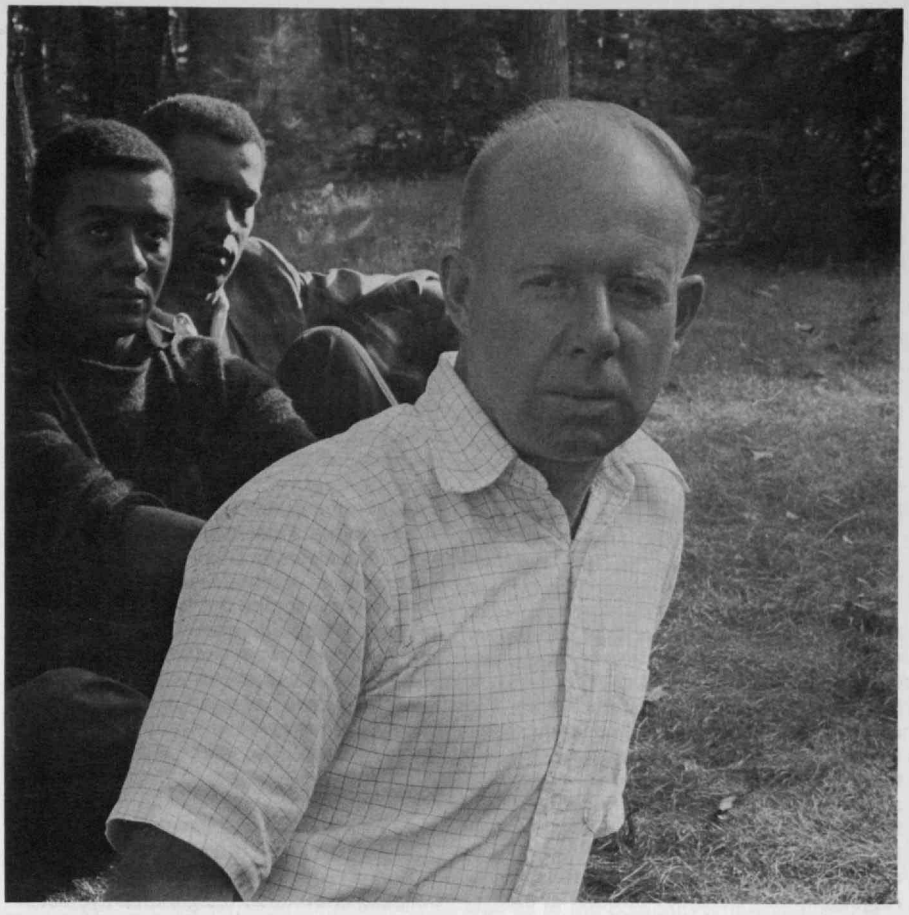
On the front page of the Washington *Post* for October 31 is an article datelined Towson, Md., October 30, which begins: "John and James Giles won their six-year fight for freedom today when the state's case against them collapsed at the beginning of their second trial on charges of raping a 16-year-old girl." The article then tells how the attorney for the state of Maryland abandoned the prosecution when his two principal witnesses failed to appear, and the judge denied his request to introduce a transcript of their testimony at the original trial. Commenting editorially on this case, which had become a national cause celebre, the *Post* said: "There is a hero in the Giles-Johnson case. His name is **Harold Knapp.** Wholly disinterested save as a citizen outraged by injustice, Dr. Knapp worked indefatigably to discover evidence not available at the original trial which led first to a modification of the death sentence, then to a court order for a new trial and at last to yesterday's denouement. Along with other Marylanders of conscience and sensibility. . . Dr. Knapp sustained the defendants through their long ordeal and kept alive through his own passion a public awareness of the great issues involved in the Giles-Johnson case. The public no less than the defendants is immeasurably in debt to him." The same story as reported in the Montgomery County *Sentinel* for November 2 begins: "Suddenly they were free. . .The State of Maryland's case against the Giles brothers (had) collapsed. . . The judge told the defendants, 'You are discharged.' Quickly the brothers were surrounded by friends, well wishers and relatives. . . But the most important well wisher was Harold Knapp, Germantown." And from the lead editorial of the same paper: ". . .Yet it remained for a private citizen, acting on his own, to unearth most of the information that eventually led to the defendants being freed. It is no fault of the state that the defendants are still alive. Credit for this goes to the incredible Dr. Harold Knapp, volunteer private investigator whose sense of justice was outraged. . . Perhaps the biggest lesson to be learned from all this is that citizens in a democracy can, if they are concerned and aggressive, rectify at least some of the state's grievous errors." The October issue of the *Washingtonian* magazine published about one month before the climactic trial on October 30 carries a fascinating article by Philip Kopper, Yale, '59, in which Harold is the central figure. The article is entitled, "The Giles Brothers Are Alive—Because of Harold Knapp, the amazing man who found out about the girl they were/are going to be killed for." People to whom I have shown this article find Harold's role as incredible as the defense story itself first sounds. They find it hard to believe that he is not a lawyer or a journalist but an M.I.T. educated mathematician and physicist who works for the Institute for Defense Analyses, a Pentagon adjunct, and who has done all of this simply as a citizen—the research and interviewing and writing on his own time and at his own expense. Furthermore, when the Giles brothers were released on bond last summer, he posted his home as security and invited them out for a two-week cram course in modern living at the Knapps', "the likes of which no humans have ever been made to endure except Emilie, Gunnar, and Tina (his children), who can't fight

back." The cram course is part of Harold's long range plan. According to the article by Philip Kopper, Harold is looking five years or so further on, when the defendants will have taken their responsible places in the community, not only free but purposeful and productive as well. Then, he says, even Judge Pugh, who conducted the first trial and imposed the death sentence in 1961, will have to recognize the object lesson. "You see," says Harold, "I am out for a rather fiendish sort of revenge." That's our feature for this month. There is more information about the case itself in *Time* magazine, November 10, under "Law" but no mention of Harold. The *Time* writers did not do as well by Harold as they did by **James W. Mavor, Jr.,** in the July 28 issue on "The Lost Continent of Atlantis" (see December notes.)

We do have other news. I am especially pleased with the flow of notes from classmates using the space provided this year on the Alumni Fund contribution envelopes. **Laurence E. Dowd,** 711 W. Hintz Rd., Arlington Heights, Ill., the only classmate ever to respond to a direct question in this column, writes that he has a new position with Chemplex Company, jointly owned by American Can and Skelly Oil. He says, "We are building and equipping a research and customer service lab in Rolling Meadows, Ill. All classmates are invited to visit after we open early in 1968." . . . **Ray C. Frodey,** 445 State St., Fremont, Mich., wrote on the envelope, "My daughter Carol is now a senior at Simmons. I'm still Vice President for Research and Quality Control of Gerber Products Company. I visited with Dr. Martin D. Schwartz, '47, in Washington recently. Mart is Vice President of North American Aviation. I also saw William M. C. Lam, '49, in Cambridge. Bill is an architectural lighting consultant." . . . **Lamar Field,** who also used his Alumni Fund contribution envelope writes that he has been Professor of Chemistry since 1959 at Vanderbilt University. He says, "After six years, two terms as chairman of the Department of Chemistry, I reverted to full-time teaching and research on July 1, 1967. I am on leave for the fall semester of 1967. I expect to catch up on writing, and to add research on biologically oriented organic sulfur chemistry to our present program on sulfur chemistry as related to anti-radiation drugs." . . .From **Tsung C. Tsu** we received a note which sounds very much like a commercial for the Alumni Fund. He writes, "I am an advisory engineer at the Research Laboratories of Westinghouse Electric Corporation in Pittsburgh. I am increasing my Alumni Fund contribution this year to take advantage of the Westinghouse Higher Education Assistance Program which will match employee contributions dollar for dollar to universities and colleges." Tsung C. Tsu also likes the idea of the message space on the fund contribution envelope. We will look forward to more such notes next month.

Burt Bromfield, Weston, Mass., our 25th Reunion Chairman, sent me volume 1, number 5, of an unusual publication called the *Explorer.* The editor calls it "a forum where prospective employees can meet and assess technical people in their fields of interest." This issue is heavily Raytheon and on the cover is a picture of **Justin M. Margolskee,** Manager of Raytheon's Bedford Laboratories. Inside is a biographical note on Justin, a description of the laboratories, the type of work done there, and the philosophy of management. Justin, who joined Raytheon in 1947 and has apparently been with the company ever since, is very enthusiastic about the whole operation. He says Raytheon is growing at a fantastic rate and needs qualified persons in many different areas. In a letter accompanying the *Explorer* Burt says that **John R. Nichols** and wife Laura were at the Alumni Seminar on campus in September. He says the Nichols now live in Lexington, Mass., and the John works at MITRE Corporation, mostly on electronic gadgetry. Also at the seminar was the brother of **Walter Masnik** who reports that Walt is in New Jersey running his own company called Flowtron making flow measurement devices. . . .We have a few clippings. The magazine *Baker* for June 1967 reports that **Andrew R. Buccini** has been promoted to Vice President of Marketing for AMF's Bakery Machinery Division in Richmond, Va. He was previously General Sales Manager, according to my newly arrived 1967 *Alumni Register.*

A press release of August 17 from Bausch and Lomb in Rochester announces a new plant expansion primarily for the Special Products Division headed by **Robert Meltzer,** Vice President and General Manager (see December notes). . . . A clipping from the Manville, N. J. *News* of August 17 tells us that **Walter P. Swain, Jr.,** 809 Johnston Drive, Watchung, N. J., was elected to the Board of Trustees of Somerset County College by the Board of Freeholders. The article states that Walter is chairman of the Wachtung Planning Board and a past president of the Plainfield Area Chamber of Commerce. He operates art supply stores in Plainfield and Morristown, N. J., and White Plains, N. Y. . . . A press release received by the Alumni Association in September announces the election of **Warren J. Harwick** as Vice President of Research and Development of Rex Chainbelt, Inc., Milwaukee, Wis. Warren, a member of the M.I.T. Educational Council, was



Harold Knapp, '44 (right), works for what he believes is just. A man who speaks of himself as "a good natured, dumb, bumbling guy with occasional moments of mediocre genius," Mr. Knapp has, through investigative persistence, been instrumental in the clemency decision and finally in the new trial in the Giles-Johnson rape case, Montgomery County, Md. The issue, according to Mr. Knapp, is still unresolved. He is concerned with the time when the Giles brothers will take their responsible places in society as purposeful and productive citizens. This is his final goal. "You see," Harold Knapp says, "I am out for a rather fiendish sort of revenge."
(Photo: Mike Mitchell; reprinted by permission of the *Washingtonian* magazine)

appointed Director of Research and Development at Rex Chainbelt in January 1967. . . .That's it. Did you exchange season's greetings with any classmates? We hope you did and we'd like to learn of any news uncovered thereby.—**Paul M. Robinson, Jr.,** Secretary, Navy Information Systems Branch, Office of the Chief of Naval Operations (Op-90F), Pentagon 5E773, Washington, D. C. 20350, 202-697-0264 or 7710 Jansen Dr., Springfield, Va., 22150, 703-451-8580; **Paul M. Heilman,** 2d, Assistant Secretary, Copper Development Association, 405 Lexington Ave., New York, N.Y. 10017, 212-687-6500 or 30 Ellery Lane, Westport, Conn. 06880, 203-227-3469; **John G. Barmby,** Assistant Secretary, I.I.T. Research Institute, 1200 17th St., N.W., Washington, D.C. 20036, 202-296-1610

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As you read these notes a lot of us will be focusing our attention on skiing or other winter sports, but as I write I am taking a brief respite from the annual battle with leaves. Trees are great in the summer but I have real doubts in the fall. Our Class has been active in school affairs with the following attending the national Alumni Officers' Conference at the St. Francis Hotel in San Francisco on September 29 and 30: Bob Hagopian, the Associate Director of the Alumni Fund; Art Schwarz; Paul Cook; Ginny Ferguson Hildebrand; and Bill Rowen. **Paul Cook** is also working as Chairman of the Alumni Fund Special Gifts Area Organization for San Francisco. Regional Chairmen for the '68 Fund include **Henry Linton** in Wilmington, Del., and **Donald Cottle** in Syracuse, N. Y. . . .The new format being used by the magazine is the result of the efforts of **Ralph Coburn** who now appears on the masthead as Art Director. . . . Did you also note classmate **Arnold Judson's** article "How I stopped Worrying" in the October issue? Arnold I just don't recall as a worrier! . . . **John Taft** is now chief systems engineer of Honeywell's Computer Control Division in Framingham, Mass. . . . **Leroy Oberholtzer** of Borg Warner's Marlsen Chemical Division in Washington, W. Va., has been appointed Vice Chairman of the Appliance Committee of the Society of Plastics Industries. . . . **J. Laurence Powell** has been named section manager of new product and new concept development at the B. F. Goodrich Research Center in Brecksville, Ohio, a suburb of Cleveland. . . . A few months back I saw a squib in the Pittsburgh paper advising that **Johnny Cowan** was now in banking in that city.

Marty Phillips forwarded a note from **Lee Hanower** which I will essentially quote "On the job side I have moved around a bit recently and I am not sure where I was when I last wrote. It was probably Allied Chemical. I left them in the early 1964 and went to Esso Chemical where I became a bit of a world traveler. I saw most of Europe, a lot of Asia and a bit of Latin America in the three and a half years I was there. My work with Esso was entirely concerned with fertilizers and agricultural chemicals for Esso Eastern Chemical, their operating affiliate for Asia and Australia. . . In June of this year I joined the Overseas Chemical Division of W. R. Grace and Company and have recently been named Vice President for Agricultural Chemicals. The geography is broadly the Eastern Hemisphere but the principal centers of activity for us are Australia, France, and Northern Europe. Home base is New York City. . . In fact Gloria and I are starting our 10th year in the same house in Closter, N. J. This must be some sort of a record. We have two children and one dog. No record I am sure. . . Outside of this the only fact I can think of that is worthy of note is that I am currently serving as President of the Chemical Marketing Research Association. . . I was hoping to make the reunion but the job change on June 1 made it impossible. Will be looking forward to next time." Thanks, Lee. Let's hear from more of you.—**Dick O'Donnell,** Secretary, 28516 Lincoln Rd., Bay Village, Ohio; **Arnold Varner,** Harvey Hubbell Company, Newtown, Conn.

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Leonard J. Stutman resigned as Professor of Pathology at the New York University Medical Center to become Director of the Blood Research Center, St. Vincent's Hospital and Medical Center, New York City. In addition, he recently became Medical Director of Presidential Life Insurance Company. . . . **Roger L. Sission** is teaching at Wharton School, University of Pennsylvania. He consults for the Philadelphia School District and has recently co-authored *A Manager's Guide to Computer Processing* and *The Management of Data Processing.* . . . **Harold Hollister** has been in Air Force marketing for Sperry Rand since 1954. He and his wife Mary live on their farm in Wilmington, Ohio, with their two girls, Peggy 14 and Jean 9. Hollister Airport and Cherrybend Pheasant Hunting Preserve, both of which are on their farm, provide plenty of leisure activity. Holly suggests that if you are flying by to stop and say hello. . . . **Seymour Stillman** maintains an office for the practice of city planning at 50 Jericho Turnpike, Jericho, N.Y. He resides in Fresh Meadows with wife Ann, and children Rickey, Kenny, Gary and Judy. Sy hopes that the first two boys are hard at work at Cornell. . . . **Malcolm E. Reed** is a Senior Research Engineer working on a gas bearing gyro lubrication problem at the A.C. Electronics Division of General Motors. The facility is in Wakefield and does research and development on inertial navigation systems and instruments. . . . **Max E. Gellert** is now Senior Vice President of Operations at Electro Development Corporation, Seattle, Wash., a company which specializes in airborne instrumentation and systems such as integrated weight and center of gravity measuring systems for aircraft.

Alan F. Kay has started a new company to automate the brokerage industry. It is named AutEx Service Corporation, and the Boston Stock Exchange is among the first clients. . . . **Robert Crane** has been traveling and presenting bio-medical papers in such diverse places as Tokyo, London and Stockholm. He is working on a Ph.D. . . . **Philip A. Dick** is Supervising Engineer of the Massachusetts Department of Mental Health and is involved in a long range program of construction of over 30 state operated Community Mental Health Centers throughout the Commonwealth. . . . **James M. Orr** graduated from University of Buffalo Medical School, completed one year of pediatric residency, spent some years in the Army Medical Corps, then completed his pediatric residency at Philadelphia Children's Hospital. He has been in pediatric practice as a member of the Holzer Clinic since 1959. The Orrs have five children. . . . **Walter M. Chaiko** has been with General Electric's Missile and Space Division for the past seven years and is currently the Manager of Advanced Technology Programs. He, his wife Barbara and children, Michael age six and Vivian age four live in Malvern, Pa. . . . **Richard W. Asmus** attended Harvard Graduate School of Business and obtained his M.B.A. in 1965. He then joined Mooney Chemicals, Inc. as plant manager, constructed a plant and trained the new management for it. He transferred to the home office as Sales Manager in September 1967. . . . **Stanley Berinsky** is a department manager in missile systems electronics at Lockheed Missiles and Space Company, Sunnyvale, Calif. He joined Lockhead in 1952, following four years in the radar systems field at Army Signal Corp. Laboratories, Ft. Monmouth, N.J. His wife and sons, ages 13 and 16, are now enjoying the benefits of sunny California.

Frank E. Guptill, Jr., has recently been issued a patent dealing with a method of preparation for lubricating greases containing finely divided inorganic metal salts and a second patent involving a process for extracting water from brine and generating steam with a hot hydrocarbon liquid. Frank is a senior research chemical engineer at the Texaco Research Center at Beacon, N.Y., and has been with Texaco since graduation. He and his wife Ruth have three children and live on Sunrise Hill Rd., Fishkill. . . . **Frank Jamerson** was a speaker at the August 22 Conference Direct Energy Conversion at the Argonne National Laboratory. He decribed research on "Plasmas for Thermionic Energy Conversion." Dr. Jamerson is a supervisory research physicist at the General Motors Research Laboratory in Warren, Mich, and lives with his wife Joy and their four children in nearby Troy. . . . **Frank J. Heger, Jr.,** of Simpson, Gumpertz and Heger,

spoke on the subject, "Design of Pavilion Dome at Expo 67," at the October 10 meeting of the Boston Society of Civil Engineers. . . . **Sanford M. Siegel,** of the University of Hawaii, spoke at a "Plants in Space Symposium" at Texas A & M University. He described experiments in which garden beans and cucumbers were grown readily from seed in only 5 percent oxygen and even in as little as 1 per cent oxygen. Not only do seeds have a tolerance to reduced oxygen, but some seeds, onion and garlic in particular, germinate in atmospheres containing 50 per cent or more ammonia. One would hardly expect onion or garlic to notice the substitution. . . . We were very pleasantly surprised recently by a visit from Charles H. Hart, '45, and his wife, Nancy. The Harts have lived in the Boston area since graduation and have finally managed to combine a business trip with a tour of the wild West. . . . If anyone from '48 ever happens through Phoenix, please drop in or at least say hello by phone.—**Richard V. Baum,** Assistant Secretary, 6711 N. 22nd St., Phoenix, Ariz. 85016; **John T. Reid,** Assistant Secretary, 22 W. Bryant Avenue, Springfield. N.J. 07081, **Robert R. Mott,** Secretary, Kent School, Kent, Conn. 06757

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It is a pleasure to begin this month's notes by naming those members of our Class who are serving as Regional Chairmen for the Alumni Fund. The job they do is important and not easy. **Harrison S. Horn** is serving the Palo Alto, Calif., area. **Anthony F. Gabrielle, Jr.,** is Chairman for the Ridgewood, N.J., region. **George H. Bradley, Jr.,** is organizing the Albuquerque, N.M., area. **Benjamin W. Roberts, Jr.,** is Chairman of the Schenectedy. N.Y., region. In the Twin Cities of Minnesota **Thomas J. Lamphier** is spearheading the device for special gifts. To these and others who may be helping, present and future students at the Institute have reason to be grateful. . . . I learn from a change of address notice that **Michael M. Koerner** is now living in Toronto. There he is President of Canadian Overseas Investments, Ltd. My principal recollection of Mike is that he was a pianist of near concert calibre whose playing gave pleasure to many. I hope he has kept it up. . . . **Samuel J. Sabbagh** has been appointed Corporate Director of Purchasing at the Acushment Process Company, New Bedford, Mass. Sam is currently President of the Southeastern Agents Association and an active member of the New England Chapter of the National Association of Purchasing Agents. He resides with his family in Marion, Mass. . . . **Frederick W. Reusswig** has been named Head of the Civil Design Group of the Operations Division of Stanley Consultants, Inc. in Muscatine, Iowa. He will supervise the design functions of the hydraulics, structural, sanitary, and transportation departments of the civil group while continuing to serve as chief hydraulic engineer for the firm. Frederick Reusswig is also a member of the National Society of Professional Engineers and the American Society of Civil Engineers.

Roland E. Derby, Jr., was the subject of a feature article in the *Sunday Sun* of Lowell, Mass. Dr. Derby is President of the Derby Company as well as Nyanza, Inc., both in Lawrence. These firms deal in dyes and chemicals, and have laboratories in New York, Georgia, South Carolina, Virginia, Chicago, New Hampshire and Lowell, Mass. Roland makes extensive use of airplanes in his business. He flies one of them from an 1800 foot runway on his 100-arce estate in Lowell. Five of of his employees hold pilot licenses. . . . **Frank P. Coy** has been named to the newly created post of Director, Management Information Systems, for Dictaphone Corporation. He will have responsibility for planning and development of all corporate-wide internal communications systems and networks. . . . **Robert A. Arrison, Jr.,** has been elected a Vice President of Picker X-Ray Manufacturing Corporation. The Picker organization is engaged in the research, development, design and manufacture of nuclear instruments and x-ray diffraction apparatus. . . . **Archie Harris** has been promoted to Manager, Market Plans and Analysis, for Autonetics Division, North American Rockwell Corporation. His son, Ken, has applied for admission to the Class of '72 at Tech. . . . **Bob King** keeps busy operating the King Burial Vault Company in Danvers and Quincy, Mass. . . . A fourth son, George Lawton Bevington, was born on March 2, 1967, according to a note from his father, **Milton Bevington.** Other sons are: Milton 15, Ricky 14, and Peter 12. . . . **Paul Gerhardt** writes that he is now Professor of Law at Northwestern School of Law Division of Lewis & Clark College in Portland, Ore. . . . **Ken Prytherch** has finally attained his goal of becoming a licensed bird bander as an extension of his hobby of bird watching out the window of his new home which was built by architect George L. Downie, '51. From the postmark on his note, I assume Ken and family live in or near Franklin Lakes, N.J. I recall that Ken was one of the very first classmates to write me for information about the 15th Reunion and then for some reason Ken, who was planning to bring the whole family, didn't make it. Well, we hope he has better luck for the up-coming 20th in Bermuda. . . . **L. Brent Kuhnle** is now Assistant Vice President of the J. A. Jones Construction Company. He is stationed in Seattle where the company maintains its only office west of the Mississippi. . . . **Fred I. Brown, Jr.,** is President of the Arkansas Foundry Company although he spends most of his time currently as Chairman of the Little Rock Port Authority which is building a river terminal and developing a 1200-acre industrial park plus setting up to operate a railroad, having received

Warren J. Harwick, '44

Robert A. Arrison, '49

permission from the ICC. Fred is also a director of the N.A.M., Vice President of the Little Rock Boys Club, on the Executive Committee of the Associated Industries of Arkansas and on the Board of the Little Rock Chamber of Commerce. . . . **Carl A. Lindstrom** is now Research and Development Manager for Electronized Chemicals Corporation in Burlington, Mass., which specializes in the production use of electron beam irradiation of plastics. Carl says this is an interesting field. He is also "squire of a large 1/10th acre island in New Hampshire."

Abraham A. Perez reports that he is presently with the Advanced Design Branch of the Lockheed-California Company in Burbank. His present field is application of latest developments in information processing technology to his company's engineering effort as well as to the company's new vehicle developments. . . . Professor **James B. Patrick** left an industrial post last September, after 15 years of research in antibiotics, to become chairman of the Department of Chemistry at Mary Baldwin College in Staunton, Va. . . . **Leroy P. Smith** has retired from the U.S. Navy with the rank of captain. He is now a mathematics instructor at Duke University. . . . **Marvin Becker,** one of the principals of Bontec Corporation, manufacturers of special products for the intimate apparel industry, has purchased B & W Auto-Sew Corporation, and formed a new company called Automation Developments Inc. which manufactures and develops equipment and processes for automation in the intimate apparel field. . . . **James C. Wootton** is an Assistant for Systems Engineering, Apollo Program Manager, Kennedy Space Center, Florida. . . . Capt. **J. R. Wish** has been a planning officer at the Portsmouth, N.H., Naval Shipyard since July 1967. . . . **Leonard P. Richardson** is with the Lubrizol Corporation as manager of its West Coast Region with an office in Whittier, Calif. He is Chairman of the Southern California Section of S.A.E. He and his wife Gerda have been married 21 years and have three daughters: Betsy, Laurel, and Gale. . . . Brigadier General **Peter C. Hyzer** retired from the U.S. Army in March 1967. At the time of his retirement he was Division Engineer, North Pacific Division, Corps of Engineers, Portland, Ore. He is now Director of Construction Engineering, Bureau of Research and Engineering, Post Office Department.—**Fletcher Eaton,** Secretary, 42 Perry Drive, Needham, Mass. 02192

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Happy New Year, 18 years out! . . . It's difficult to believe that it took us about 18 years to get to Tech in the first place, and now 18 years later, **Charlie Bostick** is back again! Charlie has been selected as an M.I.T. Sloan Fellow. Charlie is with the National Security Agency and has been awarded an M.I.T. Sloan Award. . . . Here are some random items that are of interest. **Larry Sirkis** has an active structural engineering practice in Quincy, Mass. The company is known as Hooper and Sirkis, Inc., and not too long ago moved to new larger quarters at 1245 Hancock St. Larry has been involved in such design work as college dormitories, elementary schools and factory buildings. . . . I've been wondering about the whereabouts of **Jerry Hirschfield** and was pleased to hear that he is sunbathing at 21815 Ambor Drive, Woodland Hills, Calif., where he lives. Jerry is now Manager, Advanced Projects, in the Space Programs Department at Systems Development Corporation. Jerry is working on a Ph.D. degree at UCLA in business administration majoring in the behavioral sciences. Jerry seems to be leading an interesting and hectic life which he is thoroughly enjoying. . . . **Joe Oppenheim** is living right on Broadway, 169 Broadway in Bangor, Maine.

Jim Goff is with the U.S. Naval Ordnance Lab in Silver Spring, Md. Jim was married in 1959 to Barbara L. Kral and now has two youngsters, Sidra D. and Alexander K., plus a Ph.D. degree in physics from Purdue University. . . . **Dave Hacker** is now an Associate Professor of Energy Engineering at the University of Illinois. Dave is involved with problems of very high temperature chemical processes. He lives at 319 Wesley Ave. Evanston, Ill. . . . **Beymon Blanchard** is with Aremix Inc. in Ashtubula, Ohio, where he tells me that he is wearing many hats, as is typical in a small company. He's also kept busy with a delightful family including a 15 year-old son, 13 year-old and 10 year-old daughters and a 52 lb german shorthair puppy. Beymon's address is 508 Knollwood. . . . Commander **John Alden** is now retired from active duty in the U.S. Navy and serving presently as Director of Manpower Activities for the Engineers Joint Council in New York City. He recently had a monograph published by the U.S. Naval Institute entitled *Flush Decks and Four Pipes,* and has a history of U.S. destroyers in two wars. . . . **Bill Bednar** is with General Tire and Rubber where he is responsible for developing and coordinating all corporate training programs. Previously he was a development engineer and a staff coordinator in the Chemical Plastics Division. Bill is the father of two daughters and resides at 652 Sunnyside Ave., Akron, Ohio. . . . **Bob Anderson** is Director of Industry Marketing for Honeywell's Electronic Data Processing Division, and is responsible for advanced technical systems and applications support for Honeywell computer users. Bob progressed from sales engineer, to assistant sales manager, to sales manager in Washington, D.C., to sales manager in New York City and to regional sales director in 1962. Bob and his wife, Claire, have quite a job computing their children: Bob 16, John 15, Bill 12, Carol 11, Susan 8, Linda 7, David 6, and Claire 5.

Amiel Brinkley, Jr., is with International Paper Company in Mobile, Ala., Serving as Assistant Director of Research of the Southern Kraft Division. Previously Amiel was Chief of Pulp Research and Second Assistant Director of Research. . . . **Etto Von Zastrow** is with General Electric in Auburn, N.Y., serving as manager of industrial and military power applications engineering. Etto has written numerous papers and articles on power semiconductors and has lectured extensively in the U.S., Europe, Japan, and Australia. He co-authored a book entitled *Semiconductor Controlled Rectifiers-Principles and Applications of p-n-p-n Devices.* . . . **Vinse Simpson** is the Managing Director of Trane, Ltd. near Edinburgh, Scotland. Vinse is in charge of all Trane operations in the United Kingdom including a factory in Scotland and a network of sales engineering offices serving Great Britain, Ireland, Norway and Sweden. . . . **Bob McKittrick** is Vice President of the F. McKittrick Company and of Locks and Covals Company both in Lowell, Mass. He is also a trustee of the Lowell Institution for Savings, and a member of the Chelmsford Planning Board. . . . **John Kern** is with Coleman Instruments Corporation, a subsidiary of Perkin-Elmer Corporation, and is Director of Planning and Development. Previously he was Manager of Product Planning. John also was Manager of Marketing Research and Advanced Planning for Remington Office Machines Division of Sperry Rand and served as Assistant to the Vice President of Research and Development of Royal McBee.—**Gabriel N. Stilian,** Secretary, 4 Biscayne Drive, Huntington, N.Y.

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Dr. **W. Gerald Austen,** a Markle Scholar in Academic Medicine, is now a Professor of Surgery at Harvard. He is chief of the cardiovascular unit at the Massachusetts General Hospital and is noted as a cardiac surgeon, scholar and researcher. . . . **Norman A. Bassett,** his wife Marge and their sons Eugene and Kevin live at 2209 Belmont Place, Metairie, La. Norman is working at Geophysical Service Inc. . . . **Donald L. Brown** and his wife Jane live in Richmond, Va., where he is still with Reynolds Metals Products. He is doing development work and recently designed an aluminum a-frame vacation cottage. . . . **Stephen E. Eisen,** C.L.U., entered the insurance field in 1953 and built a $5,000,000 unit from scratch. He is now a general agent in New York City. . . . Dr. **William M. Frank,** a supervisory physicist at the Naval Ordnance Laboratory in Silver Spring, Md., received the Yeshiva College Alumni Associations Bernard Revel Award last year. . . . **Karl A. Geiger,** his wife Bettyanne and their five children are still in Wayland, Mass., where he is Manager of the Special Systems Department of the National Research Corporation's Equipment Division. . . . **John F. Hennessy, Jr.,** is now the President of Syska and Hennessy, Inc. He and his wife, Barbara, live in New Canaan, Conn., with their six children.

Breene M. Kerr, formerly the Assistant Administrator for Technology Utilization at NASA and also the Assistant Administrator for Policy Analysis, resigned last spring to return to private industry. . . . **Bill Krampert** is a principal with A.T. Kearney and Company specializing in marketing research and long range planning. He recently completed four years on the Mt. Prospect Board of Education serving as President during the last year. . . . Dr. **Wallace B. Lebowitz** was certified last year as a specialist in cardiovascular disease by the American Board of Internal Medicine. He lives at 2660 Main Street, Bridgeport, Conn., with his wife Sylvia and their three children. . . . **Robert M. Lucas** is a member of the Applied Mechanics Group at Arthur D. Little working on stress analysis, vibrations and acoustics. He is active in the Scouts, makes furniture and has rebuilt an old house. . . . Captain **Edgar E. Mallick,** U.S.N., his wife Sue and their three children are in the Annapolis area where he is the Assistant Dean for Faculty affairs at the U.S. Naval Academy. . . .

Captain **Richards T. Miller** is also in the Annapolis area. He is the Head of the Ship Systems Engineering and Design Department at the Naval Ship Engineering Center and lives at RFD 3, Box 367, Melvin Road, Annapolis. . . . **Robert G. Norton** authored an article in *Rubber World* last year titled "Carbon Black: Review and Forecast." He is production coordinator for Cabot Corporation, Carbon Black Division, in Boston.

Joseph M. Pagano, still single, is an instructor at the State College in Bridgewater, Conn. . . . **Fred A. Plemenos** was named Deputy Engineering Manager of the Poseidon Program at Raytheon Company's Space and Information Systems Division earlier this year. Fred has been with Raytheon since 1954. He, his wife Elektra and their three children live at 7 Battle Green Road, Lexington, Mass. . . . **Ronald Silver,** his wife Sheila and their four children live at 557 East Angela Street, Pleasanton, Calif. He works in the Nuclear Energy Division of General Electric and is concerned with reactor licensing and safeguards. . . . **Melvin L. Stone** was a co-author of *Lincoln Laboratory Library 26th Reference Bibliography: Scattering and Attenuation by Precipitation Particles.* . . . **Mrs. Eva M. Thomas,** works with her husband in his firm A.S. Thomas, Inc. They live with their four sons in West Roxbury, Mass. Mrs. Thomas, whose latest interest is tape programming for automatic machine tools, has had a varied and interesting professional career. She was the subject of an interesting article in the New York *Times* last January. . . . **Thomas H. Veale, Jr.,** lives in Concord, Mass.; he and Eleanor have two children. He reports that he has been a member of Mensa since 1962. . . . Happy New Year from this month's author—**Mickey Alper,** Assistant Secretary, 1130 Coronet Ave., Pasadena, Calif. 91107; **Howard L. Levingston,** Secretary, 358 Emerson Road, Lexington, Mass. 02173; **Walt Davis,** Assistant Secretary, 346 Forest Ave. Brockton, Mass. 02401; **Paul Smith,** Assistant Secretary 11 Old Farm Rd., N. Caldwell N.J. 07006

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Decker G. McAllister, Jr., has joined the Ben Holt Company as a Senior Project Engineer. The Pasadena based firm provides engineering and consulting services to the chemical process and petroleum refining industries. . . . **R. Thomas Peirce** has been appointed to the position of Vice President of Marketing for the Pacemaker Corporation, Egg Harbor, N.J. He has served as industrial marketing manager for Polaroid. Peirce is active in sailing competition, participating in the 210 class. . . . **Stanley Wolk** has been selected to participate in the 52nd session of the Advanced Management Program conducted by the Harvard Graduate School of Business Administration. . . . **Leonard R. Rubin** reports that he is "alive and kicking." Major **J. D. Griffiths** is continuing research on speech communications at the Air Force Cambridge Research Labs in Bedford, Mass. He also teaches evenings at Northeastern University's graduate school and has contributed articles, in July and December, to the *Journal of the Acoustical Society of America.* . . . **Jack V. Drake** has been appointed Manager of Product Reliability of the Anchor Fasteners Division of Buell Industries, with responsibilities in the Waterbury, Conn., and Bedford Heights, Ohio, plants. . . . **James F. Rude** is currently on a field assignment for Univac in the Philadelphia area. He expects to return to school in Minnesota next spring to work towards a Ph.D. in computer science.

Jack V. Drake, '54

Last year **Donald S. Bailey** was elected Vice President of Associated Appraisers, Inc., a firm involved in large scale reappraisal of real estate tax assessment rolls. . . . **Herb Slater** writes that in last year's Metropolitan New York Alumni Fund Special Gifts campaign he was ably assisted by **Mort Davis** and **Ronnie Kurtz.** The three did an outstanding job and would appreciate help on this year's effort. Volunteers should contact Herb at 45 Sea Cliff Ave., Glen Cove, Long Island. Herb, one of our few remaining bachelors, is Vice President of Slater Electric, a fast growing supplier of semiconductors and electrical wiring devices for the building construction trade. Herb has concentrated in sales while his brother Tom, Class of '56, is Vice President of Administration and Operations. . . . Registrants at the M.I.T. Alumni Officers' Conference in San Francisco in September included **William McTigue, Rolf Kates,** and **Jerome Waye.—E. David Howes Jr.,** Secretary, Box 66, Carlisle, Mass. 01741

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A short letter and long clipping, cut from the Chattanooga *Times,* arrived from **Fred Lupton.** After graduating from Tech, he attended Columbia Theological Seminary, a Presbyterian school in Decatur, Ga., where after two years he became an ordained minister. After completing his training, he went to the Georgia Baptist Hospital in Atlanta as a chaplain-intern, and six months later went to Elgin State Mental Hospital in Elgin, Iowa, as resident chaplain. It was there he decided he could work just as effectively for the Church as a Christian layman while pursuing a career in the engineering field, and joined Pioneer Service and Engineering, a Chicago firm of consulting engineers While in Chicago, Fred met Jane Nickolson and they were married in 1963. In 1964 Fred decided to return to Chattanooga and accepted a position as an engineer at Dixie Yarns, Inc. He is currently working out digital color-matching programs for yarns by computer. Fred is very active in church affairs and is President of Senior Neighbors which has nearly 1,000 members and provides a place where older people not only can continue to learn and enjoy life with others but also can take an active part in the life of the community. Fred and Jane have a son, Frederick William, 3rd, and by the time you read this, should have made a second contribution to the population explosion. . . . On September 30, **Jim Storey** was married to Nancy Higgins of Syracuse, N.Y. Attending the wedding from our Class were **Roger Mackay, Peter Toohy,** and **Glenn Jackson.** Jim is Vice President-Administration and Treasurer of the Codex Corporation in Watertown. He and Nancy are living in Dover. Jim mentioned that **Farrel Peltz** is also at Codex Corporation as Vice President-Engineering, and that he ran into **Sheldon Busansky** in Harvard Square. Sheeley is associated with the Cambridge office of the University of Connecticut in connection with their government research programs.

A number of our classmates have been prominent in Alumni Fund activities. A Certificate of Appreciation was awarded to **Dan Brown** for his outstanding efforts as Regional Chairman of Wayland for the 1967 Alumni Fund. . . . The following members of our Class are the Regional Chairmen for the 1968 Fund and would appreciate hearing from you should you be in their area: Robert C. K. Au, San Francisco; Robert M. Dawson, 3d, Hartford; Robert P. Greene, Dover, Mass.; Robert B. Craven, Wayland; DuWayne J. Peterson, Jr., Grosse Pointe; J. William Tyler, Hamilton-Middletown, Ohio; Milon Essoglou, Arlington, Va. . . . It is a pleasure for your editors to receive letters such as that from **Fred Lupton.** The information is genuinely of interest to the rest of the Class. We hope that you will find the time to drop us a note concerning your latest activities. We are anxious to hear from you all.—**Dell Lanier Venarde** (Mrs. J.H.), Co-Secretary, 16 South Trail, Wilmington, Del. 19803; **L. Dennis Shapiro,** Co-Secretary, Research, Inc., 130 Lincoln Street, Boston, Mass. 02135

Norman F. Ness, '55 (right), is a project scientist at N.A.S.A.'s Goddard Space Flight Center, where he is responsible for optimizing the return of scientific data and the allocation of technical priorities to experiments in the Explorer series of Moon probes. In this picture he confers with Paul G. Marcotte, Explorer Project Manager, in Goddard's computer area.

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Barbara and **Bob Alter** report the birth of a second son, Michael, on July 1, 1967. Their other son, Jay, was two in November. To celebrate the expanding family, the Alters moved into a townhouse in the Hyde Park neighborhood of Chicago. . . . **Francis Curran** reports that he has worked in the scheduling department of McDonnell Aircraft in St. Louis since graduation. Currently, he is scheduling trainers for the F-4. Francis married Jeanette Gorrell in 1961 and they have two boys, Robert and Tommy. . . . **Irwin Dorros** is Director of the Transmission Service Planning Center at Bell Laboratories. Part of his work involves planning for the introduction of the picture phone. . . . **Barry Gordon** is a staff instructor with IBM in Washington. . . . Christina and **Robert Heath** announce the birth of a son, Daniel Woodward, last August. . . . **George Luthringer** writes that he and his wife Jean Ann attended the Alumni Seminar last September. . . . **Edwin Rothstein** has been appointed Chief Chemist, Central Research, of Sinclair and Valentine Division of Martin Marietta. . . . **John Sheerin** has joined Space Ordinance Systems Inc. of El Segundo, Calif., where he will specialize in marketing of electro-explosive devices and laser systems.

Arthur Sirkin writes that he is a member of the M.I.T. Educational Council in New Jersey. Art is also working part time on his M.B.A. at Rutgers and full time on the Laboratory Managers Staff at Esso Research in Enjay Plastic Fabrication Laboratory. By the way, I believe I saw a recent article of his on integrated plastic hinges in *Modern Plastics* magazine. . . . Dr. **Howard Trachtenberg** has left Mass. General Hospital for Beth Israel where he is Associate Director of Anaesthesiology, but he remains on the staff of the Harvard Medical School. . . . The 1967 National Alumni Officers' Conference was held in San Francisco last September and was attended by six classmates, **Roger Borovoy, Joseph Carleton, Martin Chetron,** all from California, and **Walt Frey** from New York, **Paul Luckett** from Odessa, Texas, and **Jack Saloma** from Cambridge. Jack was one of the speakers.—**Bruce B. Bredehoft,** Co-Secretary, 16 Millbrook Road, Westwood, Mass. 02090; **T. Guy Spencer, Jr.,** Co-Secretary, M.I.T., Room E19-439, Cambridge, Mass. 02139

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I trust all of you resolved as the New Year arrived to write me more frequently. Short notes as well as long letters will be most welcome. . . . **Herbert Klei,** Professor of Chemical Engineering at the University of Connecticut, is directing a three-year project to develop an automated sewage treatment plant that performs at optimum levels during peak loads. Supporting the project is the Department of the Interior's Water Pollution Control Administration. A by-product of the study would be data on the decomposition of matter at high temperatures and pressures. . . . **Michael Myers** has been appointed a Senior Engineer at EPSCO, Inc. EPSCO develops analog-to-digital conversion techniques. Before joining EPSCO Mike was a senior research engineer at Adcom, Inc. . . . In a brief note **Ermanno Signorelli** reports that he saw **Pierre** and **Louis de Marcken** in Wavre, Belgium, during a three month-vacation in Europe. . . . **Joel Schiffman** writes that he is in his second year of two in the Army as an orthopedic surgeon at the Army Hospital in Fort Jackson, S.C. Upon completion of this assignment he plans to enter private practice. Joel's wife, Nancy, is finishing her Ph.D. in English at the University of South Carolina. They have two daughters, aged three years and one year. . . . During the last few years **Joseph Aein** has had a number of papers, dealing with the technical aspects of space communication, published by the I.E.E.E. and others. Joe is on the staff at the Institute for Defense Analyses at Arlington, Va. He received a Ph.D. from Purdue University in 1962, and during the academic year 1965-1966 was a visiting lecturer in the Electrical Engineering Department at the University of California in Berkeley.

Ben Inserra writes that he is married and has two boys. He is working for March Construction Company, Inc., in Merrick, Long Island, N.Y., which is "a small but fast moving construction company in the general contracting field. We specialize in industrial and institutional work.". . . From **Jack Currie** I received the following letter: "In the first 10 years since graduation I've acquired a wife, daughter, son and house. I've also gained some experience working in the construction and real estate industries. Despite degrees in civil engineering, my work has been management rather than engineering oriented. Received a master's degree here at M.I.T. in 1963, and in the process learned something about computers, writing several programs for use in the highway planning field. Last January I returned to the Institute, not as a student this time, but as Assistant to the Vice President of Operations and Personnel.". . . It is very late at night as I am putting this column together. I'm on board a train from Genoa, where I've been on business for the last ten days, to Hamburg for a few more days before returning to London. Out of my window I can see snow capped peaks of the Alps illuminated by the moon. A magnificent scene! "And so to bed."—**Frederick L. Morefield,** 18 Whaddon house, William Mews, London SW1, England

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John Decker is now working at the Sperry Rand research center in Sudbury, Mass. He received his Ph.D. from Cambridge University in December 1966. They have just moved into a new modern home designed by Joseph Schiffer, '61, of M.I.T., giving the family more room. They now have a daughter in addition to their son. . . . **John Kipp** received his Th.D. last June from Princeton Theological Seminary in the studies area of the *New Testament.* He is presently Assistant Minister at Calvary United Presbyterian Church, Indiana, Pa. . . . **Bill Dreier** reports that they have added a son, David, to the family. They are still in Plainfield, N.J., where he is a partner in a law firm. . . . **Richard Nyder** has just accepted a position as head of a new West Coast division of Airborne Instruments Laboratory in Los Angeles. . . . **James Kennedy** was awarded the rank of major last January and is currently studying for a masters degree at the U.S. Naval Postgraduate School, Monterey, Calif. As you recall from our notes last season, Jim served as a U.S. Army Special Forces Team Commander in Vietnam and was shown on a documentary television feature concerning the war. . . . Currently serving in Vietnam is Captain **Philip Rasic.** Prior to assignment at Cam Ranh Bay he was with the 821st Medical Group at Ellsworth Air Force Base, S.D. Phil received his M.D. in ophthalmology from Boston University Medical School in 1962. We received a note from his wife, Patricia, telling us of his overseas assignment and enclosed were the class dues.

And speaking of class dues, our thanks to all who have contributed. At this point we are running well behind the number of contributors needed to make the Reunion a success and even behind the number who contributed for our 5th Reunion. I am sure you are as impressed as I was by the contribution sent in by Phil Rasic's wife, Patricia. Let's go, men. We all would like to see a big, successful 10th Reunion. Please make your checks for $3 payable and send to: **Warren Heimbach,** Treasurer, 2809 Palos Verdes Drive West, Palos Verdes Estates, Calif. . . . Our class had several representatives at the 1967 Alumni Officers' Conference held in San Francisco in

late September. Attending were: **Ed Bell, Toni Schuman** and **Charles Diebold.** . . . In New Haven, **Hillel Auerbach** is Secretary of the M.I.T. club there. He is with the law firm of Winnick and Winnick.—**Michael E. Brose,** Secretary, 1171 North Street, Walpole, Mass. 02081; **Antonia D. Schuman,** Western Associate, 22400 Napa Street, Canoga Park, Calif.

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Happy New Year to you all! I'm making a resolution not to forget notes due dates like I did last month. My intentions were good, but my timing was off. . . . **George Von Fuchs** is now working at the Institute fur Statik und Dynamik der Luft und Raumfahrtkonstruktionen in Stuttgart, Germany. He has a son, Kurt Frederic, born last March in Stuttgart. . . . **Robert Broder** became a registered architect in 1966, and is presently with the firm of Campbell, Aldrich, and Nulty in Boston. He is married to the former Claire Marie Meo, Wellesley, '61. . . . **William White** has been promoted to Associate Professor of Business Administration at Harvard Business School. . . . **George Huguenin** is a Senior Research Associate in the Harvard College Observatory. As an Assistant Professor of Astronomy, he has worked for the last several years on organizing a project to conduct radio-astronomy research from rockets and satellites in the long wavelength spectral regions. . . . **George Moss** received his master of science in E.E. from the University of Maryland in 1964, and registered as a Professional Engineer in that state in 1966. He is working for the Naval Oceanographic Office in Washington, D.C., in charge of instrumenting survey ships. He married Mary Elizabeth Lawrence, a premed graduate of Trinity, in 1963. They have two children, Mary Monica and William Joseph. . . . **James Snodgrass** has been named Assistant Systems and Computing Manager of Sinclair Oil. He holds an M.S. in mathematics from De Paul University, is married and has two sons, Brian and Steven.

Earl Rogers is Chief Engineer for Electro-Optical Systems in Pasadena, and has two children, Caryn 6, and Brad 3. . . . **Kenneth Kreider** is a Senior Research Scientist at United Aircraft Research Labs in East Hartford, where his primary effort concerns fabrication, evaluation, and understanding of boron reinforced aluminum composites. . . . **Robert Wempen** received his M.D. degree in 1963 from Boston University, and is serving at Brooks Air Force Base in Texas as a flight medical officer. . . . **Paul Silverman** is Vice President of Silueco Products, Inc., and is presently serving as a director of the M.I.T. Club of Chicago. He married the former Ruth Gesmer of Newton, Mass., in 1961, and they have a two-year-old daughter, Sharon. . . . **George Luedeke** is the Manager of Traffic and Transportation Systems at MevA Corporation in Fullerton, Calif. His job is to develop markets and to apply aerospace technology and systems analysis techniques to all areas of nonmilitary transportation. He now has three children, Laura Ann, Kathie Jean, and George 3d. . . . **Wayne Worrell** has been promoted to Associate Professor of Metallurgy and Materials Science at the University of Pennsylvania. . . . **Martin Gruber** received his Ph.D. in finance from Columbia in 1966, and is presently Assistant Professor of Finance at the New York University Business School. He was married in 1961 to Eleanor Cohen, has a two-year-old son, Johnathan Holmes, and is expecting a second child.

John Kusmiss received his Ph.D. in physics from the University of North Carolina at Chapel Hill in 1965, and since then has been Assistant Professor of Physics at Western Michigan University in Kalamazoo. . . . **Charles Hill** has completed two years of active duty as a captain at the Army Nuclear Defense Laboratory, Edgewood Arsenal, Md., and is currently an Assistant Professor of Chemical Engineering at the University of Wisconsin. He and his wife, Kathy, have a one-year-old daughter, Betsy. . . . **Bruce Blomstrom** is Regional Marketing Supervisor for Libby, McNeill, and Libby International where he is responsible for the Mediterranean, Middle East, and Africa. He is serving as Chairman of the Young Adults of the Chicago Council on Foreign Affairs, and is active in the M.I.T. Educational Council, the American Marketing Association, and other professional groups. Bruce has a son Jeffrey two years, and another baby is due. . . . **Howard Fabry** has completed a year of public health residency training with the New York State Department of Health, and is currently attending the Johns Hopkins School of Hygiene and Public Health. He expects to receive a master of public health in June, after which he will return to New York with his wife, Gloria, and son, Peter. They join the growing list of couples from our Class who are expecting another child about this time. . . . **Marvin Manheim** is an Assistant Professor of Civil Engineering at M.I.T., teaching courses in transportation systems analysis and in decision theories. He is particularly interested in the development of a unified theoretical approach to transportation analysis and curriculum in transportation systems. . . . That's it for this month. Keep the good word coming.—**Glenn Zeiders,** Secretary, 3 Rose Avenue, Watertown, Mass. 02172

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From **Hal Dodds:** "After completing my Ph.D. in organic chemistry at Michigan State in 1965, I started working for DuPont in Wilmington, Del. In July 1967 I was transferred to a plant technical group in Waynesboro, Va. Just before I left Michigan State I married the former Alice Keski from Dearbon, Mich." . . . **John Maguire** is now manager of the Washington, D.C., offices of C.A.C.I. His firm specializes in operations research and computer consulting work. . . . **Jon Claerbout** received his Ph.D. in geophysics in June 1967, and is now Assistant Professor of Geophysics at Stanford. . . . **Arthur Werethmann,** G.M.'61, passed the New Jersey Bar exam and was sworn in as a member of the New Jersey Bar in November 1966. He is now practicing law with his father in Irvington, N.J. . . . **Sue Schur** writes: "I am teaching a one-week welding course with Professor C. M. Adams and Dr. Stanley Weiss. We've given the course several times, the purpose being to teach people to use welding in sculpturing. Also, I was elected Chairman of the Boston Section of the Society of Women Engineers. I am still editing the Society's national publication." . . . **Varadachari Sadagopan** has accepted a new position at the Avco-Everett Research Laboratory as Principal Research Scientist in the Special Materials Division. He spent the previous two and one-half years as a research associate in the M.I.T. electronic materials division.

David L. Roberts, '60

Don Wilen says, "It's been a busy summer. I received an M.S.E.E. from Polytechnic Institute of Brooklyn in June 1967. Am a homeowner now and father of a one-year-old girl named Elana. Since August I've been Chief Microelectronic Engineer at Computer Instrument Corporation, in Hempstead, N.Y." . . . **Bob Slusser** graduated from the University of Pennsylvania with an M.B.A., then worked at N.A.S.A. headquarters in the Office of Programming until 1965 when he joined the Northrop Space Laboratories in the Marketing Department. He now works in the Forward Planning Department at Northrop. . . . **Vernon Yoshioka** and Shinobu have a new daughter, Christine, born January 12, 1967. . . . **Sanford Miller** is Assistant Professor of Mathematics at Ball State University in Muncie, Ind. He married Jill Weaver from Vancouver, B.C. She has an appointment as Instructor in Mathematics at Ball State. . . . **Ralph Buncher**

writes from Japan: "Lois and I have been living here in Hiroshima for about six months and will be here for another year and a half at the Atomic Bomb Casualty Commission. We welcome any classmates who may be passing through. The A.B.C.C. is a medical follow-up agency of the National Academy of Sciences and I am a biostatistician."

This news from **Bob Crossley**: "After three years as a project engineer at Wright-Patterson Air Force Base, the Air Force sent me to Purdue to acquire a Ph.D. The degree work was complete by January 1967, having been preceded by a son (in 1963 I married Patricia Russell, Simmons, '63) and a captaincy. My current assignment is as Assistant Professor at the Air Force Institute of Technology at Wright-Patterson near Dayton, Ohio." . . . **Lawrence Israel,** Rhea and their daughter Elise are living in Allentown, Pa. He is working in the Management Information Department of Air Products and Chemicals, Inc. . . . **Steve Cohen** is working for Charles W. Adams Associates, Inc., in Bedford, Mass., as a programmer-analyst. He is married with two children and another on the way. . . . **John Maier** is an Account Representative for I.B.M. in New York City. John says that he has been able to meet with M.I.T. people all around New York, both socially and on business. . . . **Dave Roberts** has graduated from the Armed Forces Staff College in Norfolk, Va. He is a major in the Air Force. He is now assigned to the National Military Command Systems Center in Arlington, Va. . . . **Burgess Rhodes** received his M.S. from Lehigh University this summer. . . . Write if you get work.—**Linda G. Sprague,** 345 Brookline Street, Cambridge, Mass. 02139

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Attending the 1967 National M.I.T. Alumni Officers' Conference held in San Francisco in September were **Fran Berlandi, Bill Bloebaum,** and **Barry Roach.** This was the first time that this conference was held outside Boston, and I am certain that all who attended came away much impressed with the work being done by the Alumni Association. . . . **C. W. Niessen** wrote an article entitled "Automatic Channel Equalization Algorithm," which was printed in the May 1967 *Proceedings of the I.E.E.E.* . . . **John Costello** is now working for the Badger Company in Cambridge, Mass. . . . **Winn Martin** is with Arthur Young and Company in New York City. . . . **Yin Wang** is at Burlington Industries in Greensboro, N.C. . . . **Herschel Clopper** writes that he completed his Ph.D. research at Rice University in Houston and is now a research engineer in the plastics department at DuPont's Experimental Station in Wilmington, Tex. He and Phyllis have two children, Staci Rachel and Jeffrey Scott. His new downstairs neighbor is **Alvin Feingold,** who recently obtained his Ph.D. in metallurgical engineering at Cornell. He and his wife Eileen have a daughter, Wendy. He also works at the Experimental Station. . . . **Dennis W. Readey,** who received his Sc.D. from M.I.T., has joined Raytheon Company's Research Division in Waltham, Mass., as a principal research scientist. He will be associated with research and development of ceramics for electronic applications.

David J. Bromer has also joined Raytheon Company's Research Division as a senior research scientist. He received his M.S. and Ph.D. from M.I.T. in '64 and '66. He was formerly associated with A.V.C.O. Corporation. . . . **Kenneth G. Harstad,** who received his M.S. from M.I.T., was granted a Ph.D. at California Institute of Technology last June. . . . **Robert T. Brady** has been named Vice President of Moog, Inc., East Aurora, New York. Moog, Inc. is a $25 million corporation engaged in the manufacture of electrohydraulic controls for aerospace, military and industrial application. Bob received an M.B.A. from Harvard Business School in '66. He has also served with the Navy, acting as Project Manager of Shipbuilding at the New York Navy Yard. . . . The Jefferson Medical College of Philadelphia has conferred a Ph.D. degree on Dr. **William H. Anderson,** who is now interning at Pennsylvania Hospital, Philadelphia, Pa. . . . President Johnson has named **John M. Dobson** as a Foreign Service Officer of the United States. He received this appointment after sucessfully completing highly competitive written and oral examinations. Mr. Dobson will be assigned to a position with an embassy or consulate in one of the 119 countries with which the United States maintains diplomatic relations. Only 200 young men and women are accepted out of some eight to ten thousand who take the examinations annually. After graduation from M.I.T. John received his M.S. and Ph.D. from the University of Wisconsin. . . . Army Major **Roger R. Blunt** completed the 10-month regular course last June at the Army Command and General Staff College, at Ft. Leavenworth, Kansas. He was among more than 700 officers from the U.S. and 43 allied nations who were prepared for duty as commanders and general staff officers in divisions or logistical commands. They received instruction in the function of the general staff at corps and Army levels.

E. K. Bender has co-authored a document entitled "Active Vibration Isolation and Active Vehicle Suspension" for the Department of Commerce. This report was published in November 1966, and deals with the feasibility of using "active" elements in suspension systems for high speed ground vehicles to improve vibration isolation characteristics. . . . First Lieutenant **Orrin J. Getz** completed the final two-week phase of the Army Reserve signal officer course at the Army Reserve School of New Brunswick, Ft. Devens, Mass. The course covered a four-year period of reserve and active duty training, and is designed to equip officers to serve as signal unit commanders or staff signal officers of combat units. . . . **Alexander Bogan, Jr.,** received a Ph.D. degree in physics from the Case Institute of Technology in Cleveland, Ohio, last June. . . . **Harold Metcalf**'s dad writes that Harold recently completed the requirements for his Ph.D. in physics at Brown University at Providence, R.I. Dr. Metcalf recently returned from a month in Santiago, Chile, with his wife, Marilyn. Harold was invited by the Atomic Energy Commission to spend the month of July at the Latin American School of Physics. This is a seminar held annually at various South American schools. Harold is now a research associate in the Department of Physics at Brown University. He and Marilyn have one son, David.—**Gerald L. Katell,** Secretary, Farwest Capital Company, 310 Hoge Building, Seattle, Wash. 98104

John M. Dobson, '62

Robert T. Brady, '62

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It appears that many of our classmates have moved without telling anyone where they went. The Reunion Committee has been sending out notices which are not getting to the addressee. If you have not received a notice, send your address to: M.I.T. Class of 1963 Reunion Committee, Box 119, M.I.T. Branch Post Office, Cambridge, Mass. 02139. The site for the Reunion weekend will be the Harborside Inn at Edgartown on Martha's Vineyard. **Tom Gerrity** and **Jim Champy** examined the place in detail last spring and found an attractive, scenic location on the water complete with piers, sailing, swimming and facilities for sunning and tippling. Quite a few people have already decided to come. Lodging is not limitless, so if you want to assure yourself a place you ought to write fairly soon. We are expecting to have a fine time, and hope to see you there. . . . As for news, **Jim Holcroft** is now married and enrolled at Western Reserve Medical School. . . . **Richard Weiner** is in the Army and studying Russian in Monterey, Calif. . . . **Ed Dudewicz** has one daughter and two sons and is Assistant Professor of Statistics at Rochester University. Tom Gerrity is aiming toward a Ph.D. from the Sloan School. . . . Jim Champy is finishing up at Boston College Law School and is an editor of the *Law Review.* . . . **Jim Evans** is at Lincoln Labs these days, although he frequently travels to Norway to show people how to find oil with a computer. . . . Send any news you might invent to—**Bob Johnson,** 209 East 66th Street, New York, N.Y. 10021.

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The response to the class questionnaire has been very pleasing. As of November 10, 1967, I had received 223 returns. Because of the large response and the many comments submitted I will not attempt to place everyone's name in this issue. A few of the general results of the survey are included, and the rest of this column, and of the next few to follow, will be of the whereabouts, activities and comments of those responding. The classmates listed are in alphabetical order and are taken from those questionnaires that reached my address earliest. In order to get the full information on all those responding to the survey, simply write to *Technology Review* for the succeeding issues. The Editor has told me he will be glad to furnish them providing either a subscription is taken out or a contribution is made to the Alumni Fund! . . . Of the 223 who responded, 110 are still in school (49 percent), 99 are working (44 per cent) and 14 are in the armed forces (seven per cent). Somewhat surprising is the large number that are still in school over three years after graduation, and the low number that are in the armed forces. Since the survey indicates that very few, if any, have been through the armed forces and are now in school or civilian work, this seven per cent may well represent the percentage of our Class that will have served in a military capacity. . . . The survey also reveals that 123 of those responding are married (55 per cent), and that 37 have children, this latter number being 17 per cent of all those responding and 30 per cent of those married. No unmarried classmates claimed children! . . . As an indication of political feeling, 31 seemed generally in favor of L.B.J. (14 per cent) 108 were unhappy with him (48 per cent), and the remaining 84 (38 per cent) either made no comment or responded ambiguously. In the sensitive area of the bald dome, a bushy-headed 143 (64 per cent) report a full head of hair, while only 36 (16 per cent) report a 10 per cent or greater loss. If honesty and objectivity prevailed, then this indicates a class of great tenacity, cranial retention, and shaggy locks.

And now, rather than dwell longer on interesting but lifeless statistics, let's see what our classmates are doing. **Mark Alpert** is an assistant professor of marketing at California State College, and is writing his doctoral dissertation in marketing. His wife Judy, to whom he was married on September 3, 1967, is a student. . . . **Richard Bair** has been through the Peace Corps in Nigeria, and is now teaching in high school and studying for a M.A.T. at Northwestern University. . . . **Mark Barron** is working on a Ph.D. at Stanford in E.E., while his wife Mary works as a secretary there. . . . **Robert Beardsley** is working on his Ph.D. in oceanography, and when finished will be an Assistant Professor in Oceanography at M.I.T. His wife Susan and he have a girl aged 14 months. . . . **Bill Bechtold** is working on his Ph.D. at Stanford and is working for Adcom, Inc. His wife Virginia is a teacher. . . . **Ned Block** is working on a Ph.D. in philosophy at Harvard, after having spent two years at Oxford . . . **Allan Bobko** is a lieutenant in the Navy, working in the Portsmouth Naval Shipyard as a production engineer. He and his wife Patricia have two children, aged one and two. . . . **James Boiani** is in graduate school at the University of Chicago studying physical chemistry. . . . **Steven Bollt** is an independent consultant in operations research. He is living in Rockville, Md., with his wife Nina and their six-month-old son.

Lance Bosart is working on his Ph.D. in meteorology at M.I.T. He has an interesting suggestion for a reunion activity—a clambake on the Cape. . . . **Jack Brownell** is working on his Ph.D. thesis in physics at Stanford. His wife Sandra is a math teacher. . . . **Edward Casper** is working on his Ph.D. in organic chemistry at Columbia, while his wife Gale works in the college library. Ed suggests a Symphony Hall concert as part of our reunion weekend. . . . **Lawrence Castro** is working for the Department of Defense as an electronic engineer, and is currently being sponsored by it for his M.S.E.E. at M.I.T. He was awarded a Service Commendation Medal for two years of military service in 1966. His wife Trisha is a computer programmer. . . . **Thomas Cerny** is a financial analyst for Philco-Ford Microelectronics Division in California. Tom received his M.B.A. at Stanford last year, and his wife Judith is a third year law student there. . . . **Peter Chesbrough** is working on his Ph.D. at Georgia Tech, and is looking for a job in operations research when he finishes. His wife MyraSands is a student at Georgia State in sociology. . . . **Dan Chow** is now working on his M.B.A. at Stanford, after having worked for two years in Research and Development at Pratt and Whitney Aircraft. . . . **G. F. Clancy** is working on Project Mac. His wife Joanne is a public relations assistant. . . . **Miss Barbara Cohen,** after one year at Albert Einstein Medical School, has been working in the industrial accounts section of a New York City ad agency as a technical copywriter. She lives in an apartment overlooking the Hudson River and has acquired many mod, high-fashion clothes.

Marcus Cohen received his M.S.E.E. at Stanford and is now working in the field of space communications and telemetry. . . . **Bob Colvin** is studying at Harvard Medical School, while his wife Gay is a registered nurse and a Simmons student. . . . **Charles Counselman** is working on his Ph.D. in aeronautics and astronautics at M.I.T. His wife Eleanor is also a graduate student. . . . **Edwin Duffin** is doing thesis research and working on his Ph.D. in biomedical engineering at the University of Pennsylvania. . . . **John Eulenberg** is working on his Ph.D. in linguistics at the University of California in San Diego. John also keeps busy making underground movies and playing the stock market. His wife Marcia is an occasional financial editor. . . . **Paul Fehder** is working for his Ph.D. in chemistry at Cal Tech, and notes the major achievement of having withstood Los Angeles smog for three years. . . . **Jeanne Fertel** is working on her Ph.D. in physics at M.I.T. She has had two papers published so far. . . . **Maurice Finocchiaro** is working on his Ph.D. in philosophy at Berkeley. His wife's name is Ramona. . . . **Daniel Flamm** is a Ph.D. candidate in chemical engineering at M.I.T. His wife Lois is a graduate student at Northeastern, and also keeps house for their one-year-old son. . . . **James Flink** is aiming toward a Ph.D. in food science at M.I.T., and is living in Providence. . . . **John Freeman** received his Ph.D. in E.E. in September 1967 from the University of New Mexico. He is now working in plasma physics for Sandia Corporation in Albuquerque. His wife Margaret is a junior high teacher. . . . **Leonard Gage** is in the Ph.D. program at the University of Chicago, where his field is biophysics. His wife's name is Nancy.

John Gallant is working on his Ph.D. in electrical engineering at the University of South Carolina. . . . **Alan Gamse** received his L.L.B. from the University of Maryland and is now clerking for Judge Singley of the Maryland Court of Appeals. His wife Barbara is busy taking care of their three-month-old daughter. . . . **Marvin Geller** is closing in on his Ph.D. in meteorology at M.I.T. . . . **Edward Gibson** joined the Navy in April 1967, after working as a physicist for Orion Research. His wife Frances teaches and watches over their one-year-old son. . . . **John Graham** is a full time student at the University of Minnesota Medical School, while his wife Elizabeth is an art student there. . . . **Barry Greene** is working for Pratt and Whitney Aircraft in Connecticut as a metallurgist. He received his S.M. at M.I.T. in 1966. . . . **Michael Hale** is a project director with Human Factors Research, Inc., a psychological research firm. His wife Wendy is a legal secretary. . . . **Lansing Hatfield** is an instructor at M.I.T. and working on his Ph.D. in electrical engineering there. . . . **Sanford Hellman** is a nuclear projects engineer at General Dynamics in New London. He received his M.S. in nuclear engineering previously. His wife Beth is a teacher. . . . **Herb Herrmann** is working for the Navy as a project engineer in California after having received his S.M. at M.I.T. in 1966. . . . **Paul Holland** received two S.M.'s from M.I.T., one in food technology and the other in chemical engineering, and is now working for the Public Health Service in Cincinnati. His wife Penny is a school teacher. . . . **Doug Hoylman** is working on his Ph.D. in math at the University of Arizona in Tucson.

Kenneth Jacobs has been at Cal Tech since graduation and is expecting his Ph.D. in physics in 1968. He has had papers published in the field of astrophysics. . . . **Leon Kaatz** is working as a project analyst for I.B.M., after graduating with an M.B.A. from the Uni-

The traditional Class Day competitions on the Charles River (see page 70) were enlivened in 1967 by competition from two alumni boats. In the heavyweight boat (above—the horizontal picture) were Frederick W.R. Eberle, '66, William R. Kampe, 2d, '66, Samuel H. Drake, '65, Wendell S. Brown, 3d (a Brown University graduate now studying at M.I.T.), David L. Waltz, '65, Keith D. Stolzenbach, '66, Victor Nedzelnitsky, '66, Dennis E. Kalla, '67, and Dennis E. Overbye, '66. The lightweight crew (from bow to stern) were Louis G. Johnson, '67, Frederick C. Furtek, '66, Richard W. Metzinger, '63, Dennis D. Buss, '63, Wayne C. Haase, '65 Peter Staecker, '64, Charles H. Roth, Jr., '57, Lauren M. Sompayrac, Jr., '63, and Julian R. Adams, '64. The lightweights paced the winner during most of the race, but the alumni heavyweight boat was left several lengths behind the winner.

versity of Chicago. His wife Jane of Newton and Simmons is a teacher. . . . **Lawrence Kaldeck** is working as a computer programmer for Itek Corporation in Lexington, Mass. . . . **Brian Kashiwagi** is working for Enjay Chemical Corporation in Baytown, Texas, after receiving his M.S. from Stanford. . . . **Howard Kirkendall** is a systems analyst working in New Jersey, with a S.M. from M.I.T. in 1965. His wife Sandy is keeping house for their two children, ages three and one. . . . **Frank Carpenter** is now a Unitarian minister preaching in Mequon, Wis. He suggests a speech from Julius Stratton and a dance as part of our reunion. . . **Judah Landau** is working on his Ph.D. in physics at Ohio State, and is actively engaged in the student movement against the war in Viet Nam. His wife Francine is an English and dramatics teacher. . . . **Clifford Laurence** has worked as a computer programmer, and is now a graduate student at Rice. His wife Bette is a programmer analyst. . . . **James Lerner** is approaching his Ph.D. in aerospace engineering at Stanford and is a teaching assistant. His girl friend Glenda is a teacher. . . . **Roger Lewis** was in the Peace Corps in Tunisia for two years, recently received his Masters of Architecture at M.I.T., and is now working for an architectural firm. His wife Eleanor is a teacher.

Carole Lubin is a systems analyst with St. Vincent's Hospital in New York City, following two years of programming work with I.B.M. Her chief hobby is modern oil painting. . . . **Carl Mampaey** is working on his Ph.D. in chemistry at the University of Illinois. . . . **Thomas McNabb** has his M.S.E.E. from M.I.T. and is now a staff engineer at the Instrumentation Laboratory. His wife Patricia watches over their two-year-old son. . . . **John Miller** has an M.S. in music, and is now a free lance musician and instructor at Boston University. His wife Sibylle is also a music teacher. . . . **Michael Monsler** is closing in on his Ph.D. in high temperature gas dynamics at M.I.T. His wife Barbara, Wellesley '65, is a computer systems consultant. He notes that M.I.T. is a fantastic place to be–but a life sentence is ridiculous! . . . **Bill Morton** is working on his M.B.A. at Harvard Business School, after one year of work for Itek. His wife Dorothy is a secretary. . . . **Jack Moter** is a logic designer at Raytheon Missile Systems Division and the possessor of a M.S.E.E. from Berkeley. He compliments his wife Juta, Wellesley '64, by noting that "marriage sure beats fraternity cooking." . . . **Robert Muhr** is an engineer with McDonnell Aircraft. Having started out with McDonnell, he then went to Fairchild Camera and has now returned to McDonnell. . . . **Richard Murray** received his M.A. in social psychology at Boston University in 1966. He and his wife Gail both work in the field of group therapy. Their hobbies range from piano playing to raising long-haired guinea pigs. . . . **John Nagle** is a graduate student at Harvard in government and is active in the S.D.S. His wife Ann is expecting.

Robert Oaklund is chief engineer at Icon Corporation in Cambridge. He received his M.S. at M.I.T. in 1966. . . . **Richard Ollins** is working as a Research and Development engineer for Hewlett-Packard Company and is close to an M.S.E.E. from Stanford. He has a private flying license and an "expert class" parachutist license. . . . **Marty Ormond** is now heading Goodyear's marketing research activities in their product planning group. He received his M.B.A. from Northwestern in 1966. . . . **Barry Pearlstein** is working for Hughes Aircraft out in California. His wife Marlene cares for their two children, aged six and three, and has accompanied Barry on assignments to Texas and Hawaii. . . . **Robert Popadic** received his M.B.A. at Harvard Business School in 1966, and is now with the Navy at Newport News working on a management information system. . . . **Richard Posner** is working for Hughes Aircraft and is enrolled in the Ph.D. program at U.C.L.A. He received his M.S.E.E. from M.I.T. in 1965. . . . **Jack Prosek** is an assistant project engineer for Turner Construction Company and is taking courses for his M.B.A. at Loyola. He is treasurer of the "In-Betweeners," a social club for single people 21-30 in West Chicago. . . . **Austin Purves** is teaching seventh grade science in Philadelphia. . . . **Lawrence Rabiner** received his Ph.D. in electrical engineering from M.I.T. in 1967 and is now working for Bell Labs in the field of speech communication. He is engaged to be married to Suzanne Login in June 1968. . . . **John Rainier** is close to his Ph.D. in civil engineering at M.I.T., and is active with the musical and dramatic societies at Tech. His wife Nancy works for Graphic Arts. . . . **Michael Rubin** is in the Ph.D. program at Stanford in operations research. His wife Amy keeps house for their one-year-old son.

David Russell is an engineering consultant with Liberty Mutual Insurance Company working on electronically controlled prosthetic limbs for amputees. His wife Gretchen takes care of their two sons at home. . . . **Gary Seligson** is executive assistant to the vice president at Sweetheart Plastics, after working as a marketing analyst at Gillette for two and a half years. His wife Amy is a secretary. . . . **Amiel Shulsinger** received his M.S. in Industrial Administration from Carnegie Tech in 1966. He is now an engineer with Aerojet-General working on infrared detection systems. . . . **Riley Sinder** lives in a "pad" in Venice, Calif., "dispelling darkness" and working as an "anti-draft counselor." . . . **David Spencer** is an engineer with EG and G in Bedford, Mass., and taking random graduate courses at M.I.T. . . .**Clint Sprott** is working on his Ph.D. in physics at the University of Wisconsin. His wife Mary is a nurse. . . . **Albert Teich** is pursuing his Ph.D. in political science at M.I.T. His wife Carolyn is also a student. They were in Europe a year collecting data for his thesis. . . . **Charles Therrien** is working on his Ph.D. in electrical engineering at M.I.T. He suggests having the reunion in Hawaii. . . . **John Thompson** is an aero engineer with AviDyne Division of Kaman Corporation and is taking courses at Harvard. His wife Dariel is busy watching over their two-year-old daughter.

Don Torrieri is in graduate school at the University of Maryland in physics, after working for the Martin Company and an M.S. at Brooklyn Polytechnic. . . . **Robert Warakomsky** is executive officer and project engineer at the Coast Guard Engineering Center in Wildwood, N.J. His wife Pat is a registered nurse and takes care of their three daughters. . . . **Michael Wilber** received his M.S. in computer science at Stanford in 1966 and is now working with computers at the Stanford Research Institute. . . . **William Young** received his Ph.D. in chemistry from Berkeley in 1967. His chief hobby is photography. . . . **Steven Zucker** is the senior engineer in the computer design group at Fairchild Semiconductor Research and Development, and is taking courses at Stanford on the side. His wife Lynne is a graduate student in sociology at Stanford. . . . And that, classmates, is the most that I can cram into this issue. At least this many more names will be in the February issue, so subscribe to the *Technology Review* and tune in then. . . . Your Secretary and struggling young attorney —**Ron Gilman,** 1021 Oakmont Place, Apartment 8, Memphis, Tenn. 38107.

66

Tim Carney has been appointed by President Lyndon Johnson as an officer in the Foreign Service Corps. Tim was one of approximately 200 individuals selected this past year from over 8,000 applicants who completed the necessary written and oral examinations. . . . **Sandy Blanchard** recently completed his studies in Officer Training School at Lackland Air Force Base, Texas, and is now stationed at Hanscom Field, Mass. Lt. Blanchard is serving as a development engineer with the Air Force Systems Command in the area of missile and space systems. . . . **Joe Blew** has been commissioned as a second lieutenant in the Army following his completion of Officers Candidate School at Ft. Belvoir, Va. . . . Recently, the *Daily News Record,* a trade newspaper of the garment industry, had a very interesting spread on **Rick Art** and a project that he started at M.I.T. Rick's efforts involved the application of computers to pattern layout in the apparel industry. . . . A few new additions: **Jon Meads** and his wife have become the proud parents of a baby boy, Nathan Gregory. Jon is associated with Wolf Research and Development Corporation as a senior display programmer/math analyst. . . . Received some nice news from **David Vanderscoff.** Dave and his wife are the proud parents of a daughter, Jessica Ann, born on July 3. Dave is working as an actuarial trainee with New York Life. As of last word, he was studying hard to pass his fifth Actuarial Exam, leaving him only five more to go. Elaine, his wife, has been working as a Registered Nurse at Flushing Hospital, Flushing, N.Y.

On the marriage scene: **Don Haney** was married on August 15 to the former Mary Bell Trout of Clemson University. Don is currently in graduate school at Clemson in engineering management. . . . **Robert Atkins** took Mary Burke of Marblehead, Mass., as his bride, September 2. Robert is at the University of Wisconsin working toward his Ph.D. in organic chemistry on an N.I.H. Fellowship. . . . **Theodore Gull** was married to the former Hazel Constantine of the New England Deaconess Nursing School on July 1. They are now living in Ithaca where Theodore is a graduate student at the Space Sciences Center. . . . **Stuart Spitzer** took Ronda Franklin as his bride on December 24. Stuart received his masters in E.E. this past June and is continuing at M.I.T. in a Ph.D. program in E.E. . . . **Guy Frindell** is engaged to Elizabeth Sherman of Rockville, Md. . . . **Alan Newhall** has taken a one-year leave of absence from his studies in the Doctor of Religions program at the School of Theology, Claremont College. This year he will be associated with North American Rockwell Corporation as a methods analyst. . . . **Bill McGinnis** is in his second year of law school at the University of Minnesota. . . . **Peter Lobban** is continuing his graduate work in biochemistry at Stanford with special research concerning lambda phage. . . . **Stuart Shapiro** is working toward a Ph.D. in computer sciences at the University of Wisconsin where his special area of interest is artificial intelligence.

Arthur A. Blanchard, '66

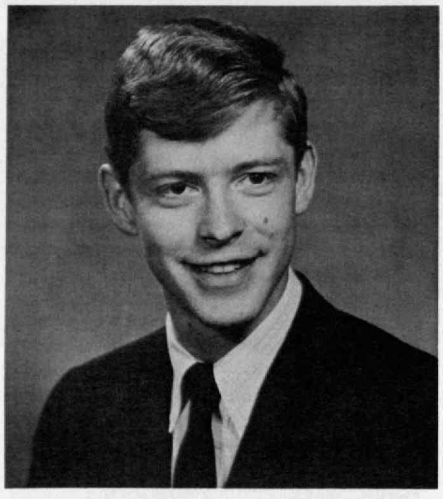
Joseph M. Blew, '66

Steve Taylor is now in his second year at Harvard Business School and is working part-time for Decision Technology, Inc. . . . **Alfred Stone** is working toward a Ph.D. in physical chemistry at Harvard. . . . **Tony Pasquale** is at M.I.T. in a masters program in E.E. . . .**John Hoche** and his wife Muffie, Wellesley, '66, are both in school this year. John is in his second year at Columbia Medical School, and Muffie is in her first year at Fordham Law School. . . . **Alan Tobey** is in his second year of studies at Luther Theological Seminary. . . . **Ralph Schmitt** is working on conceptual design studies for future manned space stations for McDonnell-Douglas in Huntington Beach, Calif. . . . Now some news on a few people who received graduate degrees with our class. . . . **Eugene Cizek** returned in August from a year of

study and travel in Europe as a Fulbright Scholar to Holland. He received a degree as engineer in city planning from Delft Technische Hogeschool, Delft, Holland, this past June, and he is presently on the faculty of the School of Environmental Design, Louisiana State University. . . . **Eytan Sheshinski,** who received his Ph.D. from M.I.T. in economics, is serving with the consulate general of Israel. . . . **Patrick Fowles** has joined Socony Mobil Oil Company to do research in the area of lubrication. . . . A few more items of note: received an informative letter from **Roland Pittman,** who is in his second year of graduate work toward a Ph.D. in physics at Stony Brook. He is already well into his research under a N.S.F. grant. This coming June, Roland will be marrying Susan Story of Levittown, N.Y. Also from Roland I learned that **Jeff Kenton** is beginning his second year of graduate work in physics at Carnegie Tech, and that **Ed Ritz** was married this past year in Portland, Ore.

And a final thought or two: our Class can be proud of its showing this past year in regard to the M.I.T. Alumni Fund. 195 out of an active roll of 744 contributed to the Fund, yielding $1752. Our Class Agent **Ken Browning** received special commendation from the Alumni Association for his efforts and success. In addition, **John Freeman** served as Fund Chairman for those students attending Harvard Business School and set a new record for participation in the Fund up there—a 75 per cent increase in participation. John has received a special award from the Alumni Association also. I would like to say here and now that money may help M.I.T., yet material donations are probably the least significant thing one can do for his alma mater. Please, please do continue to support the Fund to your fullest capabilities, but do something more—get involved with the activities of a local alumni club, get started with meeting future M.I.T. students through the educational counseling service of the Admissions Office; or plan to participate in any of the other numerous activities of the Association. It goes without saying that each of us less than two years away from our undergraduate days find ourselves throttled with a multitude of responsibilities—school, family, job—but to act and to participate is to exercise the very fundamentals of leadership. I am confident that each of you can remember something from your M.I.T. days that just did not seem right. Well, believe it or not alumni can do a lot to brighten campus life, whether it be involved with curriculum studies, athletics, activities, new campus building programs, dorms, or fraternities. Think about it and contact the Alumni Association so that you can exercise a little bit of leadership. Part of my "preaching" here was motivated by a November 8 address that I heard M.I.T.'s President Howard Johnson deliver here in Chapel Hill on the subject of "Education and Leadership in the 1980's." President Johnson pointed out that our present educational system is failing to meet the need for leaders, and that leadership no longer seems in style. Well, this may well be so, but each of us can accomplish a great deal if we contribute some effort as well as money to M.I.T.

It has just occurred to me that I may be speaking to the wrong people. All of you who receive *Technology Review* have already shown some interest. Well, how about this, if you know someone who attended M.I.T. and he is not receiving *Technology Review,* show him this edition so he can read about his classmates and his alma mater? Also, take a moment to drop me a line or two about yourself and any of our classmates you may have seen.—**Gene Sherman,** Secretary, 74 Willow Terrace Apts., Chapel Hill, North Carolina 27514



Timothy Carney, '66

Course Review

VI

David I. Kosowsky, S.M.'52, Sc.D.'55, is President and Treasurer of Damon Engineering, Inc., Needham Heights, Mass. The company was launched in 1961 by Dr. Kosowsky, **Carl R. Hurtig,** S.M.'51, and Austen Madeson to develop and manufacture devices and systems based on piezoelectric-crystal and frequency-control technology. Damon Engineering has been cited recently by the magazine *New England Business* as an exemplary enterprise which has achieved success through imaginative management, sound financing, and aggressive marketing. Involvement in foreign countries have been established through licensing agreements in several European countries and Israel. The updating of school and college science curricula has created a heavy demand for inexpensive educational materials for student experimentation, and in 1965 Arthur M. Vash, VIII S.M.'53, joined his friends in Damon to form and manage a subsidiary named Damon Educational, Inc. to develop, produce, and distribute educational equipment for the new science curricula. The company expects to nearly double its plant size within the year 1968.

Technology Review has been notified of the death on December 9 of **Samuel N. Alexander,** S.M.'33, Research Fellow at the National Bureau of Standards, one month following his receipt of the 1967 Harry Goode Memorial Award for his effective pioneering in the introduction and exploitation of computers in the federal government.

The following statements are from the biographical summary accompanying the award. "For almost 22 years Samuel N. Alexander probably influenced, more than any other individual, the introduction and development of automatic data processing techniques and systems into the operations of the federal government. As early as 1946 he led a group in the National Bureau of Standards that developed modifications of communication equipment as input-/output devices for the government. As scientific officer for the government's contract, he oversaw the procurement of the first three UNIVACs ever produced. The specifications and the acceptance and testing procedures that were established became a foundation for many subsequent procurements. During the late 1940s, he was also called upon to direct the design and assembly of what was at first called the 'NBS interim computer.' Available before any other machines, it was the first

stored-program electronic computer to become operational in this country, the first to make extensive use of diode logic, and implement it with solid-state electronic devices. Under Alexander's guidance, the design of this computer provided for a number of expansion features which were progressively implemented and proved so successful that the 'interim' designation soon became inappropriate and it was renamed the 'Standards Eastern Automatic Computer' (SEAC). It remained in use for both service computation and engineering development over a period of 14 years. Investigations conducted under his guidance were far-ranging, including the development and construction of the first transportable computer (DYSEAC), picture-processing techniques, development of an Automatic Meteorological Observation Station, and simulation of vehicular traffic flow for municipal street planning. During the past decade, Alexander also served as a consultant to the Indian Government and to the Swedish Board of Computing Machinery. In 1956, he was awarded the distinguished service medal of the Swedish Royal Academy of Engineering Scientists. The Department of Commerce twice awarded gold medals to him for exceptional service."

Samuel N. Alexander, VI, S.M. '33

James F. Kaiser, S.M.'54, Sc.D.'59, returned to M.I.T. on November 8 to present a tutorial paper entitled "The Digital Filter and Speech Communication" at the IEEE Conference on Communication and Speech Processing Systems held at Kresge Auditorium. In 1959, he went to Bell Telephone Laboratories at Murray Hill where his research is in signal processing digital filtering. During the summers of 1966 and '67, he participated in courses at Princeton University on applications of digital computers to network analysis and design, and this material is being issued as a new book under the editorship of Dr. Kaiser and Dr. Franklin Kuo. As a member of the BTL recruiting team for doctoral students, Dr. Kaiser visits M.I.T. frequently. His undergraduate work was done at the University of Cincinnati. . . . **Willard F. Rockwell,** '08, Chairman of the Boards of Rockwell-Standard Corporation and Rockwell Manufacturing Company, has been awarded the Order of Francisco de Miranda by the Republic of Venezuela in recognition of his contribution to the industrial and economic development of that country. Colonel Rockwell has received other international honors, including the title of "Commandeur de l'ordre de la Couronne" from King Leopold III of Belgium, the "Cruzeiro do Sul" of Brazil, and he was knighted by the President of Italy in the order of "Al Merito della Republica." Rockwell-Standard, headquartered in Pittsburgh, Pa., has expanded its international operations to encompass 29 affiliates in 16 countries outside the United States and Canada.

Irving R. Obenchain, Jr., S.M.'51, of Arlington, Va., recently promoted to Brigadier General by the Army, has been assigned as Assistant Deputy Manager, National Communications System, with offices at the Defense Communications Agency, Arlington. General Obenchain, an Army Signal Corps officer and a 1942 graduate of the U.S. Military Academy, will serve as assistant to Major General George E. Pickett, U.S.A., Deputy Manager of the National Communications System during the coming year. General Obenchain has been serving as assistant manager, operations, National Communications System, at DCA Headquarters. . . . **Paul G. Griffith,** S.M.'56, Professor of Electrical Engineering at his alma mater, Texas Technological College, has been named Associate Director of the college computer center. He will direct the center's research program and will be in charge of equipment installation and maintenance. His study of digital computer systems which began at M.I.T.'s Lincoln Laboratory continued with research projects at the University of Arizona where he was a member of the faculty from 1960 to 1963. He received the Ph.D. degree at Stanford University where he held a research assistantship in the Electronics Research Laboratory from 1956 to 1959.

Melvin J. Sallen, S.M.'56, has been appointed Sales Manager of Analog Devices, Cambridge, Mass., a company specializing in operational amplifiers and analog computers. Following his graduation from Northeastern University in 1953, he was research assistant and staff engineer in the M.I.T. Instrumentation Laboratory while pursuing his graduate studies. He came to his present position from the Wayne-George Corporation in Newton, Mass., where he was sales manager. . . . **James H. Whitley,** S.M.'54, is Research Associate with AMP, Inc. in Harrisburg, where he is doing research and development in transistor circuit design, in ferrite magnetics, and in the study of sliding and static contacts between metals and between metals and other substances. His undergraduate work was done in physics at Antioch College and his graduate thesis was a study of the high-frequency characteristics of ferrites

Air Force Major John F. Harvell, S.M.'62, piloted a "droop snoot" EC-135N transport during the first successful Apollo space flight late in 1967. The modified C-135 Stratolifters, sophisticated Apollo/Range instrumentation aircraft, will provide communications and tracking during launch, orbit, translunar injection, and recovery of the manned Apollo series. The 10-foot plastic nose attached to the plane encases the world's largest airborne tracking antenna. (Photo: U.S. Air Force official.)

in static magnetic fields under the supervision of Professor vonHippel. . . . **Bartow Van Ness, Jr.,** S.M.'22, reports a 42-day cruise with Mrs. Van Ness on the MS *Sagafjord* to the North Cape and northern countries in 1967. He retired in 1964 from the Pennsylvania Power and Light Company where he was chief electrical-mechanical engineer. He and Mrs. Van Ness now reside in Baltimore, Md.—**Karl L. Wildes,** Correspondent, Room 4-232, M.I.T., Cambridge, Mass. 02139

XIII-A

Graduates of XIII-A have been doing their share of presenting papers of late. **James M. Dunford,** S.M.'44, Technical Director of the Air Engineering Center, Philadelphia, delivered a paper to the Philadelphia Section, SNAME entitled "Nuclear Ship Construction—The Shipbuilder's Problem." . . . Lieutenant Commander **George L. Johnson,** U.S.N. Nav.E.'62, currently on the staff of Commander Cruiser Destroyer Force, U.S. Pacific Fleet, presented the paper "What Have You Done for the Fleet?" to the American Society of Naval Engineers. . . . **Jacques B. Hadler,** S.M.'47, visited M.I.T. in October and presented a seminar on "Systems Analysis in the Optimization of Marine Power Systems." Jack is currently head of the Ship Powering Division, Hydromechanics Laboratory, Navy Ship Research and Development Center. Jack brought Carol along this trip to visit their son studying at the Episcopal Theological Seminary in Cambridge. . . . Commander **Clayton R. Adams,** Nav.E.'52, has returned

to Portsmouth Naval Shipyard as Shipbuilding and Repair Superintendent. This is Clayton's second tour in the Shipyard. . . . **John M. Dorsey,** Nav.E.'56, is now a Senior Electrical Engineer at E.B. Division, General Dynamics, Groton, Conn. . . . **Armand M. Morgan,** S.M.'28, is now with the Marquardt Corporation, Washington, D.C.—**Robert E. Stark,** Correspondent, M.I.T. 5-317, Cambridge, Mass 02139

Sloan Fellows

Sloan Fellows will note with special interest the announcement elsewhere in this issue of the appointment of Charles A. Myers as Sloan Fellows Professor of Management. Professor Myers has worked with virtually every class of Sloan Fellows since 1941 when he first came to M.I.T. His appointment will be popular with members of the Society of Sloan Fellows, who have made possible endowment of the chair which Professor Myers now holds.

William S. Wheeler, '54, has been appointed Vice President and General Manager of the Eastern Division of Sylvania Electronic Systems, Inc. Mr. Wheeler will be responsible for the design, development, product engineering and manufacturing of that group. Before joining Sylvania he was senior staff consultant at Arthur D. Little, Inc., Cambridge, Mass., and vice president and general manager of the Military Electronics Division of Motorola, Inc. He is a member of the Visiting Committee of the Sloan School of Management and serves as Vice Chairman, Government Products Division, of the Electronics Industries Association.

The General Motors Assembly Division in Detroit has appointed **Patrick J. Coletta,** '56, as Director of Production Engineering. Mr. Coletta received his B.S. degree in electrical engineering from Villanova College in 1950 and began with General Motors that same year at the Assembly Division's Wilmington, Del., plant. . . . **Eric W. Lange,** '62, is working on a special assignment in the Manufacturing Orientation Program of the Ford Motor Company in Chicago.

Joseph F. Rocky, '61, has been appointed Manager, Marketing Research Department, Chemicals and Plastics, of the Union Carbide Corporation. He will have responsibility for all chemicals and plastics marketing research.

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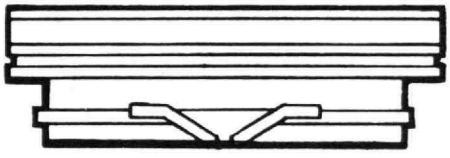

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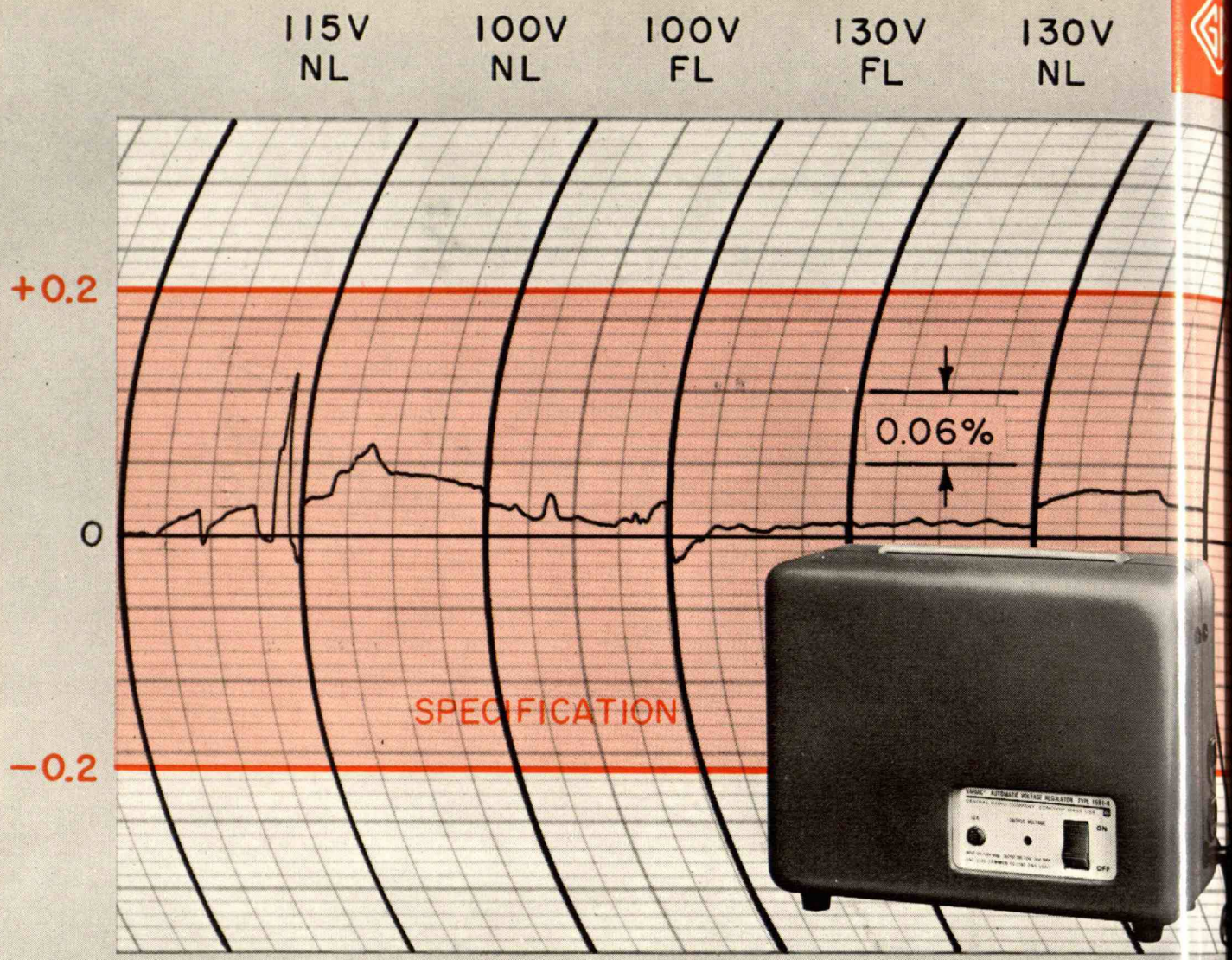

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